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A MONOGRAPH OF THE GENUS LILIUM

BY

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ILLUSTRATED BY

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Mo. Bot. Garden.
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W.G.S. sc

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TO

MY WIFE

WHO FIRST LED ME TO THE CULTURE OF PLANTS,

AND WHOSE

LOVE FOR LILIES SUGGESTED TO ME THEIR STUDY,

I DEDICATE THIS BOOK,

In Memory of

THE HAPPY DAYS I HAVE SPENT IN ITS PREPARATION.

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Scene in the North-west Himalayas at about 8000 feet elevation, where *Lilium polyphyllum* is found. (Photographed by Bourne and Shepperd, Calcutta.)

Plate

1. L. cordifolium.
2. L. giganteum.
3. L. philippinense.
4. L. Wallichianum.
5. L. nepalense. / L. oxypetalum.
6. L. neilgherrense.
7. L. longiflorum.
8. L. Browni.
9. L. candidum.
10. L. Washingtonianum.
11. L. Washingtonianum, var. purpureum.
12. L. Parryi. / L. maritimum.
13. L. speciosum.
14. L. japonicum.
15. L. auratum.
16. L. auratum, var. Parkmanni. / L. auratum, var. Wittei.
17. L. philadelphicum.
18. L. concolor.
19. L. elegans, var. venustum. / L. elegans, var. alutaceum. / L. elegans, var. atrosanguineum.
20. L. elegans, var. incomparabile. / L. elegans, var. Alice Wilson.
21. L. dauricum.
22. L. croceum, var. Chaixi.
23. L. bulbiferum.
24. L. Davidi.

Plate

25. L. Catesbæi.
26. L. carolinianum. / L. superbum.
27. L. canadense.
28. L. pardalinum.
29. L. pardalinum, var. californicum.
30. L. parvum.
31. L. columbianum.
32. L. Humboldti.
33. L. Martagon, var. dalmaticum.
34. L. Hansoni.
35. L. avenaceum. / L. medeoloides.
36. L. monadelphum (with bulb).
37. L. monadelphum, var. Szovitsianum.
38. L. tigrinum.
39. L. Leichtlini.
40. L. Maximowiczii. / L. Maximowiczii, var. Bakeri. / L. Maximowiczii, var. pseudotigrinum. / L. Maximowiczii, var. Regeli.
41. L. callosum.
42. L. tenuifolium.
43. L. chalcedonicum.
44. L. testaceum.
45. L. carniolicum.
46. L. pomponium.
47. L. pyrenaicum.
48. L. polyphyllum.

ERRATA

Under Latium vetus, line 34, *for* 9 Le *to* les *read* 9 Le Introduction. page v, last line, *for* 1876 *read* 1877

INTRODUCTION.

BEFORE attempting to give a general sketch of the true Lilies, I must inform my readers that the book is not the work of a scientific botanist, but is merely the result of a few years' horticultural study, during which I have endeavoured to bring together all the information which seemed likely to [illegible] as far as possible some of the difficult questions which are met with in the study of these plants.

It is impossible to understand properly [illegible] abstruse subjects which must be mastered before he can have, in modern times, any claim to the title of a botanist. [illegible] of study must [illegible] and as I have never had the opportunity of acquiring a scientific education, I [illegible] that I have any right to call this a botanical work. I have, however, endeavoured to give an account of every new and curious fact in the development, classification, and history of the species [illegible]. It seems [illegible] that no botanist, however great may be his acquirements, is able to understand thoroughly the [illegible] of orders, and particularly of such orders as Liliaceæ, Amaryllidaceæ, Orchideæ, [illegible] Monocotyledons, unless he has the opportunity of studying the living plants. This [illegible] be done [illegible] a horticulturist, or must have the assistance of a gardener whose mind is not exclusively [illegible] or the economic [illegible].

I think it is not yet fully recognized how intimately the two sciences of botany and horticulture are connected. No [illegible] can attain the highest rank [illegible] who has a more or less accurate knowledge of botany, and no botanist can be said to be more than half master of his subject whose studies have been confined to the library and the herbarium.

For this reason we find that such men as Herbert Lindley, Wallich, Sir William and Sir Joseph Hooker, Reichenbach, Thurber, and Asa Gray have attained a preeminent distinction as scientific botanists, and from this source [illegible] found [illegible] not [illegible] but [illegible] absolute [illegible] working botanists as a library and herbarium.

No one who has attempted to compare botanical descriptions of Monocotyledonous plants with [illegible] Phanerogams can have failed to meet with extreme difficulty in identifying [illegible] or [illegible] for which a [illegible] drawing is more useful than such a description as can be usually made from dried specimens.

The variation of plants is a subject that would require much space even to touch upon, but I may [illegible] [illegible] [illegible]

the admirable paper at the end of his work on the Amaryllidaceæ, on "Crosses and Hybrid Intermixtures in Vegetables"—that the true way to test the validity of a so-called species is by propagating it from seeds, which the tendency to vary possessed by the species will be made manifest and the varieties produced will show the observer how far he may rely upon certain characters in separating the species from others. In the same way I think that the surest way to test the validity of a genus is to attempt to hybridize the members of it with other plants, when, if we find that they will cross readily with another belonging to an apparently different genus, it affords a strong presumption of the identity of those genera.

This subject, however, is surrounded with such a multitude of difficulties that it requires the judgment and power of observation of a Darwin to investigate it with fitting accuracy. Let it suffice to say that I know of no case in which a Lily has been crossed with a plant belonging to any other genus, and that the numerous attempts at hybridizing the true Lilies *inter se* have met with very little success.

If any of the conclusions I have arrived at, as to the classification of the genus *Lilium*, are not in accordance with the views that have been expressed by others, I can only say that I have in all cases endeavoured to consider facts only, and have no preconceived theory, or desire to favour the theories of others.

It may be that, as horticulturists increase in number, and our knowledge of plants in a state of nature extends, many new facts bearing on the question will be discovered, and I can easily believe that some of the plants which now seem to deserve specific distinction may be reduced to the rank of varieties, whilst other forms may be proved worthy of specific rank. In this case I can only say that I shall welcome any well founded corrections that may be introduced into the genus, as no one can be more sensible than myself of the imperfections of my work, and no one can feel more strongly than I do that scientific truth is the first object which every worker in the great field of nature should hold up as the aim of his studies.

With regard to our present knowledge of the genus *Lilium*, I can say that I do not think many new species remain to be discovered, for though I have used every means to procure plants, living or dead, from every part of the world where Lilies are known, or are likely to occur, not more than three or four species have been added to the genus in the last four years.

The only regions from which much novelty can be expected are the Eastern Himalayas and the immense tract of unexplored and difficult mountain country which surrounds our Indian empire on the north and east, and which lies round the head-waters of the Irrawaddy, the Bramaputra, and the Yang tse-kiang. Many years must elapse, however, before these (to the naturalist and ethnologist) most interesting mountains can be even partially explored, as the extreme difficulty of the country, and the excessive jealousy and barbarism of the tribes which inhabit it, make this region more difficult of access than perhaps any other part of the world.

The Corean peninsula may also produce some new species of Lily; but though the flora of that country is absolutely unknown to us, it may be expected that any indigenous plants of great beauty or horticultural value have already found their way into the gardens of Japan.

Having found by experience that drawings of plants made from dried specimens frequently fail to give a good idea of their aspect and character, I have made it my object to procure living plants of every species which it was possible to obtain, and have had under cultivation in my own garden every known species of Lily excepting about four. Whenever I have been obliged to resort to dried specimens, or to drawings, as material for my illustrations, I have mentioned the fact in the accompanying description. It has been objected by some botanists that plates drawn from highly cultivated garden specimens do not give a good idea of the plants in a state of nature, and there are, no doubt, cases in which this is more or less the fact.

Experience, however, teaches that the state of perfection to which any Lily may be brought in cultivation, is not greater than the plant is capable of attaining under thoroughly favourable conditions in a wild state, and in proof of this I may say that the plates of *L. nilgherrense*, *L. washingtonianum*, *L. monadelphum*, and others

which are taken from the finest specimens I could procure, and which are no doubt much finer than is usual in cultivation, fall short, both in the number and in the size of their flowers, of the descriptions I have received of their growth, under favourable circumstances, in their native countries, as well as of dried specimens which I have examined.

The extreme tendency to variation in nearly all the Lilies makes it impossible to give illustrations which represent satisfactorily all their forms; but it has been my constant endeavour, as well as that of Mr. Fitch, to combine truthful delineation with artistic excellence. The colouring of the plates has, in some few cases, fallen short of what I could have wished, but though I have spared neither pains or expense to get this done as accurately as possible, there are some tints, such as the shining coral-red of *L. chalcedonicum*, which cannot be exactly reproduced except by the processes.

The materials which I have used in working out the synonymy, distribution, and variation of the plants have been as follows:—the dried specimens in the public herbaria of Kew, Paris, Leyden, and Berlin; the type specimens of Thunberg's herbarium at Upsala, the living plants in my own garden, in the Botanic Gardens of Kew and Edinburgh, and in the collections of my friends Messrs. G. F. Wilson, George Maw, Max Leichtlin, Rev. H. Ellacombe, and many others, to all of whom I must again express my most hearty thanks for the free use which they have allowed me to make of their specimens and drawings, and for the kindness with which they have assisted me in getting all possible information. From Messrs. Barr, Veitch, Bull, Kerlage, De Graaff, Van Houtte, Ware, Wallace, and other professional horticulturists I have also received valuable assistance and information, and I must say that the enterprise shown by these and others, in the introduction and propagation of plants (many of which do not prove profitable from a business point of view) has been, and I hope will always be, of the very greatest service and advantage to the botanist and scientific student.

Among my correspondents abroad, I must thank especially Dr. Regel and Prof. Maximowicz of St. Petersburg, Herr Max Leichtlin of Baden, Prof. Duchartre and the Abbé David of Paris, Dr. King of Calcutta, Profs. Sergeant and Watson of Harvard University, and Messrs. Pringle and Hanson, Otto Groenen, and others in the United States, for the immense assistance they have given me by communicating information and plants, all of which I have acknowledged in the body of the work, and without which it would have been impossible to complete it.

And, finally, most important is the assistance I have received from Mr. J. G. Baker, of the Royal Herbarium of Kew, upon whose Revision of the Liliaceæ in the 'Journal of the Linnean Society' all my work is based, whose scientific descriptions I have used in almost all cases, and without whose experience and help so freely shared to myself and others, I feel I should have failed to keep my work free from many errors and omissions.

LITERARY HISTORY OF THE GENUS.

The Lilies, being conspicuous and beautiful plants, have attracted the attention of authors from so early a [illegible] it would be impossible to enumerate all the pre-Linnean writers who have mentioned them. Those who are curious as to their ancient and mediæval history will do well to consult M. de Cannart d'Hamale's 'Monographie Historique et Littéraire des Lis' (Malines, 1870), where many quotations are given in poetry and prose, and where many strange facts and fancies concerning Lilies are quoted from numerous authors. For our present purpose, however, it will only be necessary to mention a very few of these, among whom Parkinson takes a leading place. This charming old writer, whose 'Paradisus, or Garden of Pleasant Flowers' was

published in 1683, puts the Lilies at the commencement of his work, because the Lily is the more stately flower among manie," and after describing the Crown Imperial, which, "for his stately beautifulness, deserveth the first place in this our garden of delight," proceeds to enumerate the species known to him, which are described with wonderful accuracy in the quaintest of Elizabethan English. Parkinson mentions five varieties of the "Martagon Imperial" (*L. Martagon*)—"the spotted Martagon of Canada" (*L. canadense*), which had been already introduced to Europe at this early period, "the early red Martagon or Martagon Pomponey" (*L. pomponium*), "the red Martagon of Constantinople" (*L. chalcedonicum*), "the bright red Martagon of Hungarie" (*L. carniolicum*), and "the yellow spotted Martagon" (*L. pyrenaicum*). He gives rough though characteristic woodcuts of these plants, and mentions the "place" or habitat, the "time" or season of flowering, and the "names" or synonyms of each. Of the umbellate Lilies he mentions six varieties, distinguishing clearly between *L. croceum* (the "gold red Lily") and *L. bulbiferum* ("the red-bulbed Lily"). He then describes two varieties of the white Lily, which complete the list of those known to him.

Kæmpfer in the 'Amœnitates Academicæ,' published in 1712, mentions several species of Lilies, among which, though they were ignored or overlooked by Linnæus, *L. cordifolium*, *L. speciosum*, and *L. tigrinum* can probably be recognized.

Linnæus, in the 3rd edition of his 'Systema Plantarum' (1762), describes nine species, viz. *L. candidum*, *L. bulbiferum*, *L. pomponium*, *L. chalcedonicum*, *L. superbum*, *L. Martagon*, *L. canadense*, *L. philadelphicum*, and *L. kamschatkense*. He treats as varieties several plants which are now ranked as species, and includes one, *L. kamschatkense*, which we now refer to the genus *Fritillaria*.

Thunberg, who spent many years in Japan, published, in 1784, his 'Flora Japonica,' in which the following species are described:—*L. candidum* = *L. longiflorum*, *L. japonicum*, *L. pomponium*, probably = *L. callosum*, *L. bulbiferum*, ? = *L. elegans*, *L. superbum* ? = *L. speciosum*, *L. canadense*, ? = *L. Hansoni*, *L. philadelphicum*, ? = *L. elegans*. He seems to have determined to make all the species he found in Japan agree with those described by Linnæus, and, in consequence, we are unable to identify with certainty several of them; but, in the second volume of the 'Transactions of the Linnean Society,' he gives further details of some of his species, and describes *L. speciosum*, *L. longiflorum*, and *L. cordifolium*. Still later he published, in the 'Memoirs' of the Imperial Academy of Sciences of St. Petersburg, 1811, an "Examen Liliorum Japonicorum," in which seven species are described, and three badly figured, viz. *L. lancifolium*, *L. longiflorum*, and *L. maculatum*. Most of Thunberg's descriptions are so vague, or taken from such imperfect or abnormal specimens, that they cannot be relied on with certainty, and it was only by examining the specimens in his herbarium that I was able to make out that *L. maculatum* and *L. lancifolium* are not good species, and that *L. elegans* is what has been hitherto known as *L. Thunbergianum*.

Though Walter, Michaux, Gawler, Don, Fischer, and others added one or more species each to the genus, no great increase to our knowledge was obtained till Von Siebold went to Japan and sent home numerous specimens of Lilies, both living and dried, about 1830. All those which he found were enumerated in Siebold and Zuccarini's 'Flora Japonica,' where *L. callosum* is first described, and a fair account given of the other species known to him.

Roemer and Schultes's 'Systema Vegetabilium' (1829) and Kunth's 'Enumeratio' (1843), being merely descriptive catalogues of plants, need not be referred to, except to say that *L. Wallichianum* was first described by Schultes.

The first attempt at a monograph of the genus is the "Mémoire sur les espèces du genre Lis," by D. Spae, published in 1847, in the nineteenth volume of the 'Mémoires de l'Académie Royale de Belgique.'

This memoir enumerates all the species known at that time, and gives careful descriptions, with synonyms, history, and detailed instructions for the cultivation of the various species. It was by far the most

complete and useful account of the genus until quite recently, as it includes all SIEBOLD's discoveries, and, being the work of a skilled horticulturist and fair botanist, was based on careful observations of living plants which as I have before said, are indispensable for the study of Lilies.

In 1870, PROFESSOR DUCHARTRE, of Paris, was attracted by the unequalled collection of living Lilies formed by HERR MAX LEICHTLIN, of Carlsruhe, and, wishing to make them better known to the horticultural and scientific world, he published, in the second series of the Journal of the 'Société Centrale d'Horticulture' of France, his "Observations sur le Genre Lis," an elaborate and most careful paper, of 142 pages, in which the history and classification of the genus is elaborated with much detail, and careful descriptions in French are given of all the species then known.

About the same time MR. J. G. BAKER, of Kew, published, in a series of articles in the 'Gardeners' Chronicle' for 1871, a synopsis of the genus, which has had an enormous influence in making it better known and appreciated by horticulturists, and was the principal guide I had in taking up its study.

The direct result of the labours of MESSRS. LEICHTLIN, DUCHARTRE, and BAKER has been so great that I do not think there is any genus of plants, having so extensive a range of distribution, which has been studied with as much completeness, or about which so little remains to be discovered, as the Lilies; and, though there is much to be done before the minutiæ of their development and variation can be said to be fully known, yet I do not think the publication of a Monograph on them is so premature as it would be in the case of most other wide-ranging genera of plants.

PROF. SERENO WATSON has recently published, in the fourteenth volume of the 'Proceedings of the American Academy of Arts and Sciences,' July 1879, a Revision of the North-American Liliaceæ, which gives a complete description of the Lilies of that country, and which, I am glad to see, agrees very nearly with my conclusions as to the species and varieties.

Besides the writers already mentioned, the late PROF. KARL KOCH has published, in the 'Wochenschrift für Gartnerei und Pflanzenkunde' for July and August 1870, a memoir of the genus, in which he gives a key to the [illegible], together with critical notes on their synonymy and distribution.

MR. J. H. KRELAGE, of Haarlem, whose nurseries probably contain a larger number of Lilies than any others in the world, has published a 'Notice sur quelques espèces et variétés de Lis,' in which several species are described and figured—among them *L. Wittei*, *L. Humboldti*, and *L. tigrinum flore pleno*.

In America, DR. KELLOGG has described several of the western species in the 'Proceedings of the California Academy of Natural Sciences;' and many notes on hybridization and cultivation have appeared in various periodicals.

The horticultural journals of the last few years, especially the 'Gardeners' Chronicle' and the Garden, have contained a [illegible] number of valuable notes [illegible].

As a strictly scientific account of the genus, MR. BAKER's Revision of the Tulipeæ, in the 'Journal of the Linnean Society' for 1874, is pre-eminent. [illegible] remarks on the affinities, relations, and geographical distribution of the genus cannot be understood by any one wishing [illegible] them thoroughly.

PROF. DUCHARTRE, of Paris, has [illegible] Bibliothèque de l'Ecole des Hautes Etudes, vol. v. 1873, and vol. xiv. 1875, two most remarkable memoirs on the bulbs of Lilies, in which the various stages of their development from the seed are most carefully described and figured with extreme care and completeness. An excellent series of drawings of the bulbs of Lilies in their adult state has been made by MR. BURBIDGE, and was published in The Garden in 1876.

CLASSIFICATION

In Mr. Baker's revision of the Liliaceæ, which is the latest as well as by far the most complete and scientific arrangement of the order, the Lilies are included with the Tulips, Fritillaries, Calochorti, Erythronia, and Lloydias in the tribe Tulipeæ, and form a very homogeneous group, few of the plants included in it being aberrant from the general type. It has been subdivided into five subgenera, of which four are natural and well marked; but there are a few plants which do not seem to fall conveniently into either of these subdivisions.

The characters by which we can best classify the Lilies are taken from the bulb, and from the form and position of the flowers. The first subgenus, *Cardiocrinum* of Endlicher, is a very distinct and well-marked one, and comprises only two nearly allied though perfectly distinct species, *L. giganteum* and *L. cordifolium*. The bulb in these is formed of a few thick closely compressed scales, produced into long petioles, which bear a large cordate evergreen leaf. Until the bulb becomes strong enough to flower, which is at about its sixth or seventh year, there is no stem or other leaves than these basal ones; but the flowering stem, when produced, absorbs the whole substance of the bulb, and the plant perishes completely after ripening a number of seed, which is produced very abundantly. In some cases, however, offsets are formed at the base of the old bulb, which grow to a flowering size. Now this manner of reproduction, namely by seeds, appears to me the natural and regular course in this subgenus, for though in cultivation the reproduction by offsets is so common, yet in its native forests *L. giganteum* appeared to me to grow as though all the plants were seedlings, and I saw no groups of offsets about the base of the old stems, as one sees in garden plants. I should not, therefore, consider that either of these species is a true perennial, and am inclined to think that many other Lilies usually considered perennial are not so, strictly speaking, for I have found that many of them, after being brought to the highest state of perfection, and having produced seeds freely, die away unaccountably, as though they had fulfilled their function, and had by the act of seeding exhausted all the vitality of the bulbs.

The next subgenus, *Eulirion* of Endlicher, is characterized by long tubular flowers, the segments of which are hardly reflexed, except at their tips. It includes, according to Mr. Baker's arrangement, the following species—*L. philippinense*, *Hatfieldianum*, *neilgherrense*, *japonicum*, *longiflorum*, *Brownii*, *japonicum*, *candidum*, *belladonna* and *L. asiaticum*. Now as to the first six of these I have not the slightest question about the propriety of this arrangement, as they seem to me to be very possibly only subspecies, and comprise all the representatives of the family found in the eastern tropics or Oriental region—the sixth, *L. Brownii*, being the only representative in Japan. But I think that *L. japonicum* has more affinity with *L. auratum*, placed by Mr. Baker in another group. *L. belladonna* is probably a synonym of it; *L. candidum* (our common white Lily) seems to me to have sufficient peculiarities in structure and habit to justify its separation from the *Eulirion* group; and *L. Washingtonianum* I should be inclined to place, with two near allies or subspecies, in another section.

In the subgenus *Eulirion* thus restricted we find a very different bulb-structure, consisting of a large number of upper pointed scales, which bear narrow linear leaves only, in their earlier stages of growth, and throw up stems at the age of two or three years, flowering freely and ripening seed. Usually, however, they produce as well a number of small bulblets, which are formed either at the base of the old scales, at the base of the stem, or all along its subterranean portion, and frequently at various points on the stem above ground, especially when any injury has checked or arrested the formation of flowers.

The plants included in the genus *Eulirion* seem, therefore, to be true perennials, that is to say, they possess the power of reproducing themselves for an indefinite period without seeding. They are the only Lilies which are found within the tropics, and appear to require, and to thrive under, a greater degree of heat than other Lilies, though they are all inhabitants of hilly or elevated regions. I believe that the season of growth in these plants is regulated, in their native countries, not by the summer and winter, but by the rainy and dry seasons.

L. Wallichianum and *L. sulpherineum*, at any rate, do not commence growth till the rains begin in June, and ripen their seed in midwinter, when all the Lilies of temperate climes have gone to rest.

With regard to *L. candidum*, we find certain characters of habit which seem to keep it apart from other Lilies. First it has, like *L. giganteum*, leaves of two different classes,—first, the basal leaves, which are borne on the new scales in the centre of the bulb, and appear early in autumn, coinciding with the period of [illegible] the countries to which it is supposed to be indigenous; and, secondly, the stem-leaves, which are borne on the flowering stem, and do not appear till the basal leaves are withering. The flowers also of this Lily are not quite similar in form to those of the *Eulirion* or any other group, so that the plant seems to have some claim to an isolated position.

L. Washingtonianum, with its variety or subspecies *L. purpureum*, and a newly-discovered plant *L. Parryi*, though resembling the *Eulirion* group to a certain extent in their flowers, are so different in the structure of their bulbs, that they must also stand in a group apart from any other.

The next section is *Archelirion* of Baker, in which he includes *L. tigrinum*, *speciosum*, *auratum*, and *oxypetalum*. This does not appear to me a very natural group, *L. tigrinum* seeming to have more in common with the Martagons, whilst *L. oxypetalum* is an aberrant form, differing entirely in bulb and habit and having nothing but the position of the flowers to bring it near *auratum*. If this section is to stand, I think it should include *L. japonicum*, which is certainly nearer to *auratum* than to the *Martagon* Lilies.

The next [illegible] section of Baker, including all the plants with erect flowers and falcate [illegible] bulb-scales, [illegible] of species [illegible] bulbs that resemble those of *pyrenaicum* and *dauricum* are [illegible] have [illegible] with [illegible] and [illegible] close into each other [illegible] some of the garden [illegible] by [illegible] they are produced. These plants, again, may be called perennials—propagating themselves constantly by means of [illegible] as well as by seeds. [illegible] very [illegible] modified [illegible] of its scales [illegible] are

The other four plants included in the section by Mr. Baker, namely *L. concolor*, *L. philadelphicum*, *L. Catesbæi* and *L. medeoloides*, are [illegible] regarded [illegible] flowers [illegible] top [illegible] bulb-[illegible] but in [illegible] bulbs [illegible] habit very [illegible] are [illegible] [illegible] of [illegible] [illegible] which are alluded to in detail in the text of this work, and which are probably modifications of structure intimately connected with the natural conditions under which they grow. *L. Catesbæi* is a small, delicate species, confined to a very narrow range as regards its distribution, and probably not fitted to survive in the struggle for existence with other plants.

In the case of *L. medeoloides*, if the very limited materials on which our knowledge of this plant is [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the position of the flowers, but so nearly allied to *L. ovatum* in every other respect, that I cannot help suspecting an abnormal condition of the specimens on which it was founded. If not, I can only say that [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

To recapitulate briefly, I find that the subgenera which have been proposed in this genus are not except in the case of *Cardiocrinum*, really natural, or if they are natural as regards certain species, they are not so for others; I should therefore prefer to drop them entirely. The genus is not so large or so diverse as to require the maintenance of artificial groups such as these seem to be, and though I will indicate the affinities of the different species, together with the principal characters by which they may be recognized I will not pretend to support an arrangement which cannot, as I think, be dissected by a careful observer without revealing imperfections and errors.

GEOGRAPHICAL DISTRIBUTION

The Lilies have a somewhat peculiar geographical distribution, being found nearly all over the temperate zone of the Old and New Worlds, but, with the exception of three or four species (all of which belong to the *Eulirion* section), nowhere within the tropics. As far as our present knowledge extends, they are absent from the immense tract of country between the Caspian Sea and Western China, though the mountain-ranges of Turkestan may be found to contain some as yet unknown species.

The climatic conditions which seem to favour their growth are a moderately cold winter of short duration, and a warm spring and summer with considerable moisture. Thus we find them absent from those parts of Europe and Asia which are subject to perennial or periodical seasons of severe drought. The two centres in which their headquarters seem to be are Japan, with about twelve indigenous species, and California with eight or nine. The Himalaya Mountains, where the climatic and other conditions seem very favourable are not so prolific as might be expected, only five species occurring there, whilst in Europe we have seven, and in the Eastern States of North America five or six.

Except in the case of the *Eulirion* group (which are subtropical), none of the sections seem to favour one country or continent more than another; but the bulbs of Lilies belonging to different sections seem to have similar modifications in the same country. For instance, all those with stoloniferous bulbs are North American, and all those with large oblique bulbs are Californian, whilst no European or Asiatic Lily has a bulb which could be mistaken for an American species by any one who was at all conversant with their peculiarities.

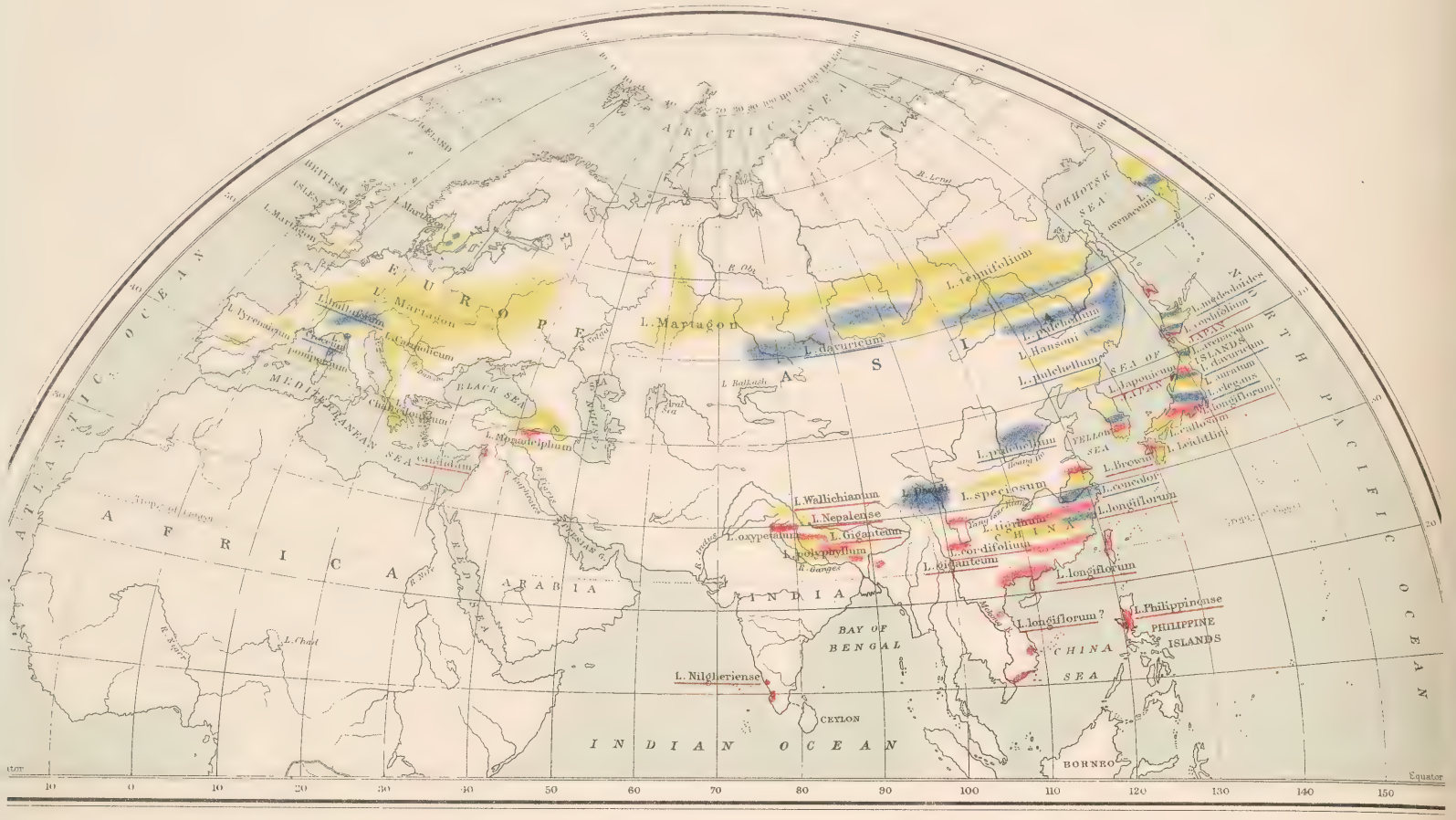
The annexed Map will show, as nearly as is possible on so small a scale, the habitat of the known species, though it is of course understood that the boundaries of their distribution cannot be indicated by the colouring when several of the species occur together in one district.

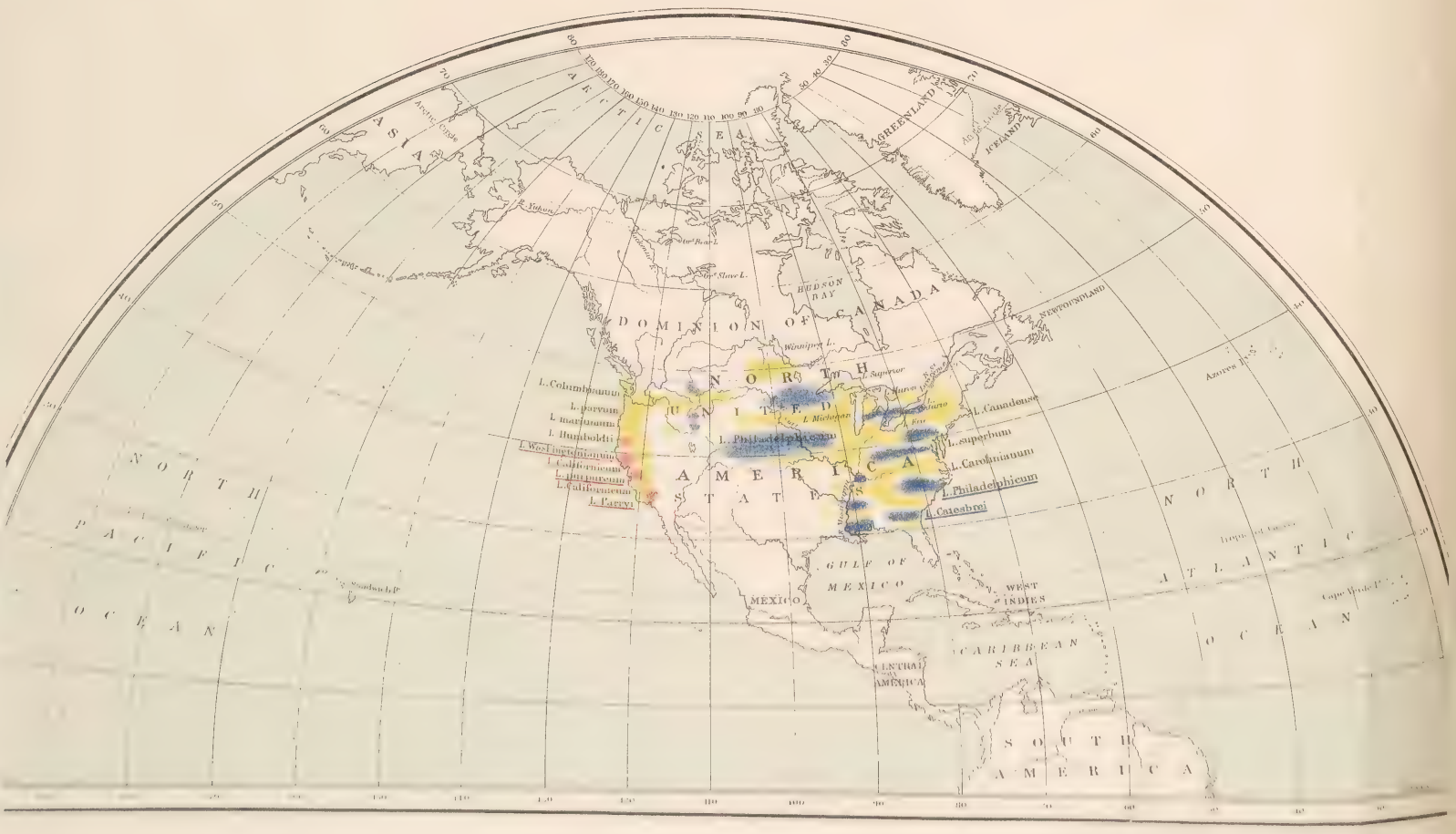
It will be noticed that there are some curious anomalies in their distribution, which coincides with that of no other genus which I can call to mind. In the *Eulirion* group we have a case which resembles that of many animals and birds in the same region. We find *L. wilhelmiæ* and *L. philippinense* confined to isolated mountain-ranges, and separated from any of their congeners by nearly 1000 miles of sea, or by a great extent of land, which, being unsuited, on account of its climate, to the requirements of Lilies, is a perfect barrier against the extension of their range.

In the same way we find many birds confined to the isolated hill-regions of Southern India whose nearest allies are in the Himalaya Mountains, but if the analogy between birds and plants holds good, I should expect to find Lilies in the high mountains of Java and Sumatra rather than in Luzon, whose fauna is less akin to that of South-eastern Asia than the faunas of Java, Sumatra, and Borneo.

Another point worthy of notice is the great difference between the Lilies of the Atlantic and Pacific States — thus establishing the fact, which has been so clearly shown by Prof. Asa Gray and Sir Joseph Hooker, that the zones of distribution of plants in the United States are longitudinal rather than latitudinal, and that the flora of the Pacific States has much less in common with that of the Eastern States than would be expected.

GEOGRAPHICAL DISTRIBUTION OF LILIES.





— Note —

In these maps the distribution of the known species is shown as nearly as is possible with the imperfect knowledge we have of most of Central Asia where many blanks are unfilled. The yellow colour indicates the species belonging to the Martagon and Archetirion group of Baker. The crimson shows the species belonging to the Eutirion group including the subgenus Cardiocrinum. The blue shows the Isolirion group as defined by Baker. Where two colours occur in stripes it is understood that two species are more or less evenly distributed over the region coloured. Where the colour is in spots it shows that the species are very restricted or irregular in their distribution.

The range of *L. pyrenaicum* is perhaps the most curious of all, and cannot be accounted for by any known cause. An inhabitant of the Pyrenees and perhaps of certain other [illegible] found in Bosnia and Transylvania, but is entirely absent from the whole of the Alps of Central Europe (where it is represented by *L. pomponium* and *L. carniolicum*), and again reappears, in the same or a very closely allied form, in the mountains of Lazistan, at the south-east corner of the Black Sea.

The Lilies of North eastern Asia are much more localized and have less resemblance to those of Europe than analogy would lead us to suppose. *L. martagon* is the only one which can be called a local variety of any European species, the most [illegible] and widely distributed of all species, while a good majority of the birds, plants, and insects of East Siberia are remarkably similar to those of Europe. To the Lilies of North Japan, however, we find the closest similarity, several of the species, such as *L. Hansoni*, *L. arenaceum*, and *L. callosum*, being identical in Japan and on the mainland.

The following List shows the habitats of all the Li[illegible]

1.	*L.* [illegible]	North Japan and [illegible]
2.	*L. japonicum*	Nepal, Sikim, Khasia hills, and probably East Tibet
3.	*L.* [illegible]	Island of Lazistan
4.	*L.* [illegible]	Kumaon, and perhaps Nepal
5.	*L.* [illegible]	Nepal
6.	*L.* [illegible]	Mountains of Southern India above 6000 feet elevation.
7.	*L. neilgherrense*	Southern and Central China, probably Formosa, Loochoo Islands, and South Japan
8.	*L. formosanum*	Islands of Corean archipelago, and probably adjacent mainland
9.	*L. coreanum*	Northern and eastern coasts of the Mediterranean, in several scattered localities, though how far indigenous is very doubtful
10.	*L. Washingtonianum*	Oregon and [illegible]
11.	*L. pomponium*	Coast range of [illegible]
12.	*L. Parryi*	[illegible]
13.	*L. speciosum*	[illegible]ly regions of [illegible]
14.	*L. japonicum*	[illegible]
15.	*L. rubrum*	[illegible]
16.	*L. pyrenaicum* [illegible]	[illegible]
17.	*L.* [illegible]	Japan
18.	*L. canadense*	[illegible]
19.	*L.* [illegible]	Japan
20.	*L.* [illegible]	Eastern Siberia and [illegible] Japan
21.	*L.* [illegible]	Alps [illegible]
22.	*L.* [illegible]	Alps [illegible]
23.	*L.* [illegible]	[illegible]
24.	*L. Parryi*	East Tibet, bordering on Szechuen
25.	*L.* [illegible]	Canada, from New Brunswick west to Rainy River, and south to [illegible]
26.	*L.* [illegible]	New Brunswick to [illegible]
27.	*L.* [illegible]	[illegible]
28.	*L. californicum*	Coast-range and foot-h[illegible]
29.	*L. parvum*	Sierra Nevada, northwards [illegible]
30.	*L. columbianum*	British Columbia to North [illegible]
31.	*L. maritimum*	Marin and Humboldt counties, California.
32.	*L. Humboldti*	Foot-hills of Sierra Nevada, and coast-ranges from Santa Barbara to San Di[illegible]
?	*L. Martagon*	Central Europe, from France and South Sweden to Ural Mountains and S[illegible]
34.	*L. Hansoni*	Coast of N.E. Siberia and North Ja[illegible]
3	*L. arenaceum*	Coast of N.E. Siberia and North Japan
36	*L. monadelphum*	W[illegible]
37.	*L. tigrinum*	Japan
38.	*L. Leichtlini*	[illegible]
39.	*L. Maximowiczi*	Japan
40.	*L. callosum*	Japan and A[illegible]
41.	*L. tenuifolium*	East Siberia.
42.	*L. polyphyllum*	N.W. Himalayas, and perhaps [illegible]
43.	*L. szovitzianum*	K[illegible]
44.	*L. chalcedonicum*	Greece, and probably A[illegible] and Central T[illegible]
45.	*L.* [illegible]	[illegible]
46.	*L.* [illegible]	[illegible]
47.	*L.* [illegible]	[illegible]

CULTURE

Though I have given directions for the cultivation of the various kinds of Lilies in the body of the work, yet I think some general remarks on the subject may be of use

It is evident, from the large amount of correspondence which has appeared on the subject in the horticultural papers, that great diversity of opinion exists on the question, and though some writers profess to be able, by following out certain theories of culture, to ensure success, yet experience has shown that no amount of care or skill will enable us to grow Lilies unless the natural conditions of climate are favourable

I know of no plants which seem to have such uncertain and incomprehensible constitutions (if that term can be fitly applied to plants) as Lilies, and I am more and more inclined to believe that in many cases they are not truly perennial Whether this is the case or not, it is a fact (which no experienced Lily-grower will deny) that just as the perfection of development is attained, and the plant appears to be as flourishing as possible, a rapid decline in vigour comes on without any apparent cause, and is followed by death, or by such complete exhaustion and collapse that any further pains and care are in most cases thrown away

These remarks must not, however, be applied to all Lilies, as there are several species (such as *L. candidum*, *L. bulbiferum*, *L. Martagon*, and *L. californicum*) which may be grown with reasonable care almost anywhere, while others (such as *L. Catesbæi*, *L. Wallichianum*, *L. ovalifolium*, and *L. washingtonianum*) have repeatedly baffled the skill of the most experienced horticulturists.

Before considering the causes of this want of success, it will be well to examine the general conditions under which Lilies grow in their native countries, and there are three points worthy of especial notice —

First, a considerable degree of summer heat is requisite, and though this may be accompanied, as in Central Europe and the United States, by severe cold in winter without injury, yet we do not find Lilies thrive well in a cool wet summer

Secondly, we find that a good deal of moisture is necessary during the growing-season, either in the form of rain or mist Long and severe droughts are not characteristic of any country where Lilies are abundant, or if they occur (as in parts of California and Southern Europe), we find Lilies only at considerable elevations, or growing in marshy and moist places.

Lastly, it seems to be almost universally the case, that the partial shade afforded by grass and weeds, or overhanging shrubs, is a necessary condition for their health, and perhaps this in cultivation is overlooked more often than any thing else. I have repeatedly found some varieties thriving in out-of-the-way corners, where they were almost buried in rank weeds and grass and quite uncared for, whilst the same plants in rich soil, but exposed to the sun, were weak and unhealthy

Protection from wind, from spring frosts, and from the baking of the soil by exposure to sun, are, I think the most important points to be considered, and if combined with these conditions we can obtain moisture at the root, and a considerable degree of warmth in summer and autumn, there is little doubt of success with the majority of species

Rich soil, however, is of no use, unless it is sweet and well drained, as one finds, in pot-cultivation, that the roots will not occupy the good soil provided for them if it is at all sour or sticky. The constituents of the soil are, in my opinion, not so important as its condition, for though some Lilies, such as *canadense* and *superbum* certainly prefer a considerable admixture of peat, and refuse to grow in soil containing lime, whilst others, such as

monodelphum and *canadense* do best in a rather heavy soil, if in the right degree. Moisture is ready for use when required, but too much weight tends to the nature of the soil.

The great drawbacks we have to contend with in England are—the heavy cold rains of autumn and winter, acting on the soil at a time when the roots are most inactive, and thereby frequently causing them to rot, and the late spring frosts, which injure the shoots when first appearing above ground.

Perfect drainage will no doubt help the plants to endure the first of these evils, and artificial protection will secure them, in many cases, against the second, whilst a liberal mulching of light manure, leaves, or cocoanut fibre, will keep the ground from becoming dried up in summer.

The insect pests which affect Lilies most severely are *Aphides*, or green flies (which are most injurious to them when grown under glass, and must be thoroughly kept down by fumigation and syringing), and a minute white insect which is generally found in abundance in the bulbs of unhealthy plants (but which is, I believe, rather the result than the cause of disease). A fungoid [illegible] spot [illegible] often observed to attack the leaves of Japan Lilies in wet cold weather, and is, I have no doubt, caused by want of warmth. The disease which destroys so many thousands of *Lilium auratum* does not, however, seem to be of a similar character, but is more probably caused by a lack of moisture at the roots, or the exposure of the bulbs to the air. The sudden shedding of leaves, however, and disease which so often disappoint all one's hopes with this species, are very capricious, and perhaps, out of a hundred plants [illegible] precisely similar conditions, only twenty, thirty, or fifty may suffer, whilst the rest remain healthy and flower well.

Since the preceding was written, we have experienced in England one of the most protracted and severe winters, followed by one of the coldest and wettest summers ever known; and the results have been (as I anticipated) most disastrous to Lilies. My own losses have been so great that I have almost despaired of replacing them, and though in the drier soils of the eastern and southern counties I believe there have been fewer deaths, yet I fear the cultivation of these favourite plants has received a severe check. Perhaps the most remarkable case was that of a long bed of Californian Lilies, mostly varieties of *L. californicum*. These had become perfectly established in large clumps, and came up in the spring with unusual strength. After they had grown five or six feet high, and in most cases produced numerous buds, they became covered with [illegible] which soon rapidly [illegible] the whole plant. Week after week of dull and [illegible] weather had apparently induced [illegible] some similar disease to that which destroyed the potato crops so generally in 1879, and the result was that they died off either without flowering or with [illegible] poor [illegible].

A parcel of these stems was submitted to the Rev M J Berkeley, whose experience in the fungoid diseases of [illegible] unrivalled. His report, as printed in the 'Gardeners' Chronicle,' [illegible] follows:—

"I have not [illegible] a fungus suspected of [illegible] the [illegible] become spotted and unhealthy. From time to time specimens have been submitted by one of our most zealous and intelligent cultivators to the Scientific Committee of the Royal Horticultural Society, but without eliciting any thing at all satisfactory. No treatment or change of soil seemed to have any beneficial effect, and our own experience is in exact accordance. Whether in the conservatory or in the open air, we have never found specimens in a wretched condition, and sometimes belonging to the very commonest species. Nothing however has ever equalled, as regards condition, what we now have before us. The disease is no longer confined to the spotting, but affects the whole plant, extending even to the bulb, which will soon be in as deplorable a state as the plant itself. No potatoe stem affected with the *Peronospora* was ever in a worse state than what we have before us. The condition may perhaps have been aggravated by the fact that, though the bundle of stems weighed [illegible] above eight ounces, an extraordinary heat had been produced by their decomposition, which first attracted [illegible] by the temperature of the letter which accompanied them. As the mass was so small, it was immediately

conjectured that the heat must have arisen from a peculiar tendency to decomposition. The consequent change of colour in the cells penetrates deep into the tissues of the stem, and in parts the leaves are passing into a gelatinous mass. At the same time there is no certain explanation of the cause. There is not a trace of any parasite except *Asteroma polygonum*, DC., on an early stage of growth, and even supposing that the spotting were connected with this (which is not impossible from what we know of *Asteroma rosæ*, which is so destructive this year), we fear that the closest consideration, as in so many other cases of disease, is not likely to suggest a possible remedy.

This somewhat melancholy report is, I am afraid, all I can add to the question of Lily disease. Mr. G. F. Wilson believes that exposure to sun and wind is the primary cause of the disease; but if so, how is it that we often see a quantity of Lilies in a greenhouse go off in just the same sort of way, and without any exposure at all? Truly the matter is at present inexplicable, for it often occurs that, in the same house or bed where these sad deaths are taking place, other plants of the same species are flourishing exceedingly; and I know that even in the summer of 1879 Lilies did well in some places.

If I were about to recommence the cultivation of Lilies, I should build a house or frame on purpose for them, arranged, as nearly as possible, in the following manner:—

A span-roofed pit should be made in a sheltered situation, with the ends facing north and south, sunk about three feet in the ground, and having an entrance at one end, with a narrow path down the centre. The lights should be made either to slide down and take off like the lights of a frame, or so hinged that the pit could be completely thrown open when desired. I think this important, because the complete exposure of the plants to spring and summer rains when not too violent is of more benefit to them than any amount of syringing or watering; and by lifting or drawing off the lights, and replacing them with some shading material in hot sunny weather, we avoid the burning and drying up of the soil, which is so difficult to prevent under a fixed glass roof.

No heating-apparatus would be necessary, as the slight frost which might penetrate the house in very severe weather would not injure the plants when in a dormant condition. The brick sides of the pit would be about a foot or eighteen inches above the ground-level, and might have ventilators of pierced zinc to break the draught. The beds would be built up with brick to about ground-level, and the height of the ridge from the earth should be not less than seven feet, or more if it be desired to grow many plants of *Lilium auratum*. The beds would be composed of a drainage of 9 or 10 inches of broken bricks, stone, or tiles, covered by some sods of good soil laid over them, and filled in with about two feet of a compost consisting of about half light loam, one quarter coarse sand, and one quarter loose fibrous peat, well broken up and mixed together. A part of the beds might have a mixture without peat, and another part should be composed of half peat and a quarter leaf mould; but care must be taken that any leaf-mould used for Lilies is thoroughly rotten and free from fungoid growth. Decayed cocoanut-fibre has been found an admirable substitute for leaf-mould, and may even be used instead of peat, though I should prefer the latter when of good quality. A good sprinkling of broken crocks, small stones, or clean coarse gravel may be mixed with advantage through the whole mass of soil; and a mixture of broken charcoal is also advantageous, as until the roots of the plants have occupied the soil there is always a risk of its becoming sour; and I believe that charcoal will not only prevent this, but also enrich the soil.

If the house could be planted with bulbs already well rooted and established in pots, I should prefer it, as among a number of purchased bulbs there will always be many failures, and there is some danger of their decay affecting the soil. If however, the entire stock of plants was purchased, I would not plant them out till they had begun to make root, as it frequently happens that bulbs which have been lifted and severely checked lie dormant for several months, and when in this state they are likely to rot if kept at all wet.

In a part of the house a bed should be kept for plunging plants in pots, so that newly imported bulbs

[illegible] until they had made a good start. However large a bulb may be, and whatever depth of soil it may require when established, it is always good policy to start it in a small pot, and either shift it to a larger one or plant it out when well rooted. It is also unwise to put more than one newly imported bulb in the same pot, or to plant a number together, where a good effect is desired, until their season of flowering has been ascertained. It frequently occurs that in a batch of imported bulbs of *L. auratum* and others, some will begin to flower in June and July, and others not before September, October, or even November; and the beauty of a pot or group is somewhat marred when withered stems are mixed with those in flower.

When our Lily-house has been once established, it will be necessary to keep a most careful look-out for insects, which, if once allowed to get strong, will hide themselves in the young leaves, and do much damage unseen. A frequent and regular fumigation in spring and summer is essential to keep them in check; and if this is done regularly, the cultivator may be at ease, as neither thrips, mealy-bug, or red spider is to be feared in an unheated house. The lights should be thrown off whenever the weather is warm and pleasant, and whenever there is a nice mild rain. If none falls, a thorough good soaking of soft water should be given occasionally to all plants which are well rooted and growing freely, and more moderate supplies to the rest. A good syringing when the house is shut up in the evening during the spring and summer months is also of great advantage.

During hot sunny weather the lights should be removed, and replaced by a shading of tiffany or some similar material, and care must be taken on no occasion to burn the plants by keeping the lights on without shade, for though some of them will stand a great deal of direct sunshine without apparent injury, yet serious results often ensue.

As soon as the Lily-grower is fairly acquainted with the various species, which only experience can make him, he will be able to select for himself those species which he prefers. Many Lilies are unsatisfactory plants to grow, and will probably disappear of their own accord in a year or two.

In purchasing bulbs, let him always select those which are plump and fresh, though of moderate dimensions; the largest bulbs are rarely the best. Let him endeavour to procure all home-grown varieties as soon as possible after they have been taken up in autumn, for if kept in sand or cocoanut fibre all the winter, they will [illegible] very much weaker. They will flower one of the first years, and will be slow in regaining strength. With regard to imported bulbs, however, those are usually best which arrive in January and February; for if taken up in Japan early enough to allow them to be sold in England before Christmas, they are often imperfectly matured.

Care should always be taken, when purchasing bulbs during or after a severe frost, to see that they are [illegible]; disappointments often incurred by this cause, and for sending bulbs to friends, at home or abroad [illegible].

With regard to packing Lily bulbs I can add little to what I have said in speaking of *L. philippinense*. The great point is to [illegible] the happy medium between too much moisture and the reverse, and to pack them tightly that, without crushing, they may keep firm in the box.

During the last two years a new mode of cultivating Lilies has been suggested and put into practice by Mr. Wilson, of Weybridge. This gentleman, believing that want of shelter was the main cause of failure in many instances, has laid out a piece of boggy woodland as a wild garden, and planted in it thousands of Lilies in various positions. Though I have no doubt that, if the various beds are kept from being overgrown by rank weeds, some of them will prove very successful, the soil being very suitable for most of the species, yet I am inclined to think that the shade of the trees is too great at present, and that in a dry summer their roots will [illegible] be moved to the [illegible].

Considering, however the very unfavourable season of 1879, and the want of time to establish the plants Mr Wilson's experiment promises a considerable measure of success, and is certainly a very interesting one I am not, however, inclined to believe that he will succeed in establishing all or nearly all the Lilies in a wood any more than in a garden, and, considering the varied nature of their habitats, it is not to be expected that he should in all cases succeed.

A theory which has been started and written on at great length by a correspondent of 'The Garden' signing himself "Doxedin." as to the annual renewal of the bulbs of Lilies, is, I believe, founded on an entire misapprehension of the functions of their bulbs

This writer, as far as I can understand his very lengthy communications, maintains that the bulb of a Lily is completely absorbed by the flowering stem, and entirely renewed annually by a new growth of scales in its interior He reasons therefrom that the proper season to lift and transplant the bulbs of Lilies is immediately after the flowers have withered The generally received opinion that the leaves of the plant have considerable influence in maturing the growth of the bulb, and assisting it to store up the necessary nourishment for the next year's flower-stem, is ridiculed by this writer, but, in the correspondence which took place in 'The Garden,' his theory was, I think, successfully disproved by several of our best Lily-growers. I believe myself that a continuous growth of new scales from the axis of the bulb is constantly taking place at all seasons, though much more actively in the spring and summer, and that this growth only ceases when the bulb has attained its maximum development or when checked by removal, or by some other cause affecting its health. The development of the seedling plants as examined by M Duchartre certainly bears out this opinion.

The propagation of Lilies is effected in various ways:—first, by division of the bulbs, which increase rapidly in most of the European and in many of the American and Japanese species, secondly, by planting the bulbets which are formed in the axils of the leaves of *L. tigrinum* and *L. bulbiferum*, and at the crown of the bulb or on the base of the stem in many other species thirdly, by seed, which, though a tedious and somewhat difficult process, is in many cases, the only way by which an increase can be obtained. For instance, *L. Washingtonianum*, *Humboldti*, *columbianum*, *polyphyllum*, *Catesbæi*, *philadelphicum*, never as far as I have seen increase themselves by division or bulbets, whilst in the case of *L. giganteum*, *cordifolium*, *tenuifolium*, and *pulchellum* seeding seems to be the normal manner of reproduction. Judging from the groups in which we find Lilies growing in their native habitats, many species, such as *L. croceum* and *L. pyrenaicum*, which in gardens increase more readily by offsets, are propagated by seed under natural conditions.

Germination takes place very irregularly in different species, and according to the time at which the seeds are sown. As a rule, it may be said that, if sown as soon as ripe, the seed will germinate in spring, but under glass it often comes up sooner, as in the case of *L. tenuifolium* and *L. longiflorum*. If the seed is kept till spring before sowing, it usually lies a year before germinating, and sometimes longer, and if more than six months old, it very often does not come up at all

The only seeds of *L. candidum* which I ever sowed came up in September, at the same time as the autumnal leaves of the parent plant, and I have observed that the germination of the seeds of other bulbous plants usually takes place at the same time as the vegetation of the same plant. The seeds should be sown in boxes or in a frame, about a quarter of an inch deep, in light soil, and the ground should be made tolerably firm under them. If sown in pots, they must be kept plunged, or the young bulbs will soon be starved, and as soon as strong enough they should be turned out into a frame

As seedling Lilies grow very slowly for two or three years, they should not be planted in the open ground at first, and careful watch must be kept against slugs, which will devour the leaves of scores in a single night Moss is very apt to grow over the soil and choke them, drought is also very injurious, so that, from one cause or another, [illegible] how small a per centage of seedling Lilies ever come to the flowering stage One of

two species, such as *L. longiflorum* and *L. tenuifolium*, will flower the third season after sowing; but the majority and especially the *Martagon* group, take six to ten years before they attain flowering size.

It has been supposed by some that the constitution of Japan Lilies may be improved by raising them from seed in this country, and there is no doubt something to be said for this theory, but, putting aside the extreme care and patience which are necessary, I think experience shows that deterioration of size and colour is the usual result. Certainly the Japan Lilies which are cultivated by thousands in Holland are inferior in the size and tint of their flowers to those imported from their native country, and though I believe this is not the case in America, yet the climate of the New-England States is much more like that of Japan than is the climate of Holland or England. I have not noticed that the home-grown bulbs of *L. auratum*, which have succeeded so admirably in the garden of Mr. M'Intosh, are more easy to grow in my own garden than imported ones, and though I believe Messrs. Waterer and Noble have found the soil of their nurseries very favourable for the propagation of Japan Lilies, yet I believe we shall always be more or less dependent on a foreign supply to keep [illegible] stock.

A fourth mode of propagation is by scales, and consists in pulling off the scales of sound bulbs and planting them separately, when, in some cases, small bulbets are formed at the base of the scale, which in time grow to be bulbs. This mode is most commonly adopted with *L. speciosum* and *L. auratum*.

The hybridization of Lilies has been attempted by many cultivators, but seems to have produced little result; and in many cases, where all means have been taken to remove the anthers of the seed-bearing plant before maturity, the produce has shown little variation from the parental type*. Some of the varieties of Orange Lilies now in cultivation are supposed to have been raised by crossing *L. elegans* with *L. croceum*, and plants are sometimes met with [illegible] which present characters leading one to suppose that they may be hybrids between other species. The only well-known cases in which there appears to have been a decided success in crossing are those of *L. testaceum* (which is believed with good reason to be the result of a cross between *L. chalcedonicum* and *L. candidum*) and *L. Parkmanni* (which was raised in America by crossing *L. auratum* and *L. speciosum*). Other supposed hybrids have been mentioned in the gardening papers, most of which have an American origin; but from [illegible] the characters which mark them. A wide field, however, is open in this direction to the [illegible] there seems to be no physiological reason why Lilies should not be subject to the same laws of [illegible]

* [illegible] *L. auratum*.

Lilium Philippinense

LILIUM PHILIPPINENSE.

THE PHILIPPINE LILY

[illegible]

[illegible]

[illegible]

[illegible]

THE beautiful plant and new species of Lily which those who have attended to my work in the Botanical Magazine already know under the name of *Lilium Philippinense* and as it only exists in a living state in the hands of Messrs. Veitch and Sons of Chelsea I am sure everyone must feel grateful to them for allowing me to use their plant for the illustration of this work before it has been distributed to the public.

It was in the year 1873 that Mr. Wallace, our well-known naturalist and traveller, being then on a journey in the Philippine Islands (the main object of which was to procure the numerous and lovely Orchids for which that locality is celebrated), visited the Island of Luzon, and the Province of Tayabas in particular. He there met with the present species in 1873. It was sent to Messrs. Veitch's establishment in August 23, 1873, when it produced its flowers. The bulbs were sent home in a growing state, and flowered

quill, and clothed with unusually fine and grass-like leaves, is not more than 9–18 inches high, while the flower, which is rather inclined upwards than hanging, seems to [illegible] where the soil is poor rather than rich, and grows by hundreds in small patches, partially shaded by overhanging trees. The soil is of a very light nature, allowing the abundant moisture to pass off freely and is composed of a mixture of loam with decomposed trachyte and coralline limestone. The trees which grow in the vicinity consist of species of *Quercus*, *Ficus*, *Rhododendron*, *Santonea*, *Scadophyllum*, Melastomaceæ, Cæsalpiniaceæ, and some stately tree ferns. The subalpine character of the situation, however, is better shown by the herbaceous plants, among which are dwarfed species of *Viola*, *Campanula*, and *Anemone*. Lower down the mountain Orchids and other epiphytal plants were abundant. Among forms that I particularly noticed were *Cypripedium argus* and a *Cypripedium* resembling *villosum*. With regard to the probability of other species of Lily existing in the Philippines I can say but little, the mountain-ranges of these islands (which attain the elevation of 10,000 feet or more) being almost unexplored. In the islands of Mindanao and Mindoro, owing to the piratical habits of the natives, it is almost impossible to travel, though I have no doubt many fine discoveries might be made there. The only other high mountains I ascended were the Mahalat range in Luzon, and here I was disappointed by finding nothing so remarkable as in the district of Benguet.

I was afraid that the bulbs of *L. philippinense* when brought to the warm climate of Manilla would soon decay, but, thanks to the vitality of their scales, each of which seems to have the power of producing a tiny bulblet, I was enabled to bring them safely to England.

I would here add that the main point to be attended to in packing the bulbs of Lilies for transport is to protect them from heat and excessive moisture, which soon destroys them when deprived of their roots. Thousands of bulbs have been lost from ignorance or inattention to this fact; but, on the other hand, care should be taken not to allow them to become overdry from exposure to the air, which soon shrivels up the fleshy scales of which they are composed. No substance is better for packing small parcels of bulbs than sphagnum moss, which can be obtained in most parts of the world. Failing this, light fresh soil, not too moist, or sawdust is the next best thing, and care should always be taken to pack them so tightly that they cannot be shaken in the box. In cases where the plants cannot be allowed to remain until their stems have naturally decayed in autumn, it is better to transplant them, with the roots as fresh as possible, to some shady spot in a garden until they are at rest, than to pack and send them off when in full growth. Before packing for a long journey, and especially if hot climates have to be traversed, it is a good plan to expose them for a few days to the air, which will dry up the superabundant moisture of the outer scales and render them less liable to rot. However carefully packed most Lilies are still injured by a long transport, and do not make healthy growth for a year or more after they are replanted. Growers of Lilies, remembering this, must therefore not be disappointed if the flowers of some of their perhaps highly prized introduction are poor and colourless, or perhaps altogether absent, for a year or two—but patiently waiting till the plants have recovered their natural vigour, will be rewarded by a display which cannot fail to give pleasure to those who can appreciate their delicate beauty.

With regard to the culture of *L. philippinense*, I am informed by Messrs. Veitch that the bulbs are somewhat delicate, and grow best in a warm house in small pots plunged in a bed of fibre or soil. When growing they require, like other Lilies, abundance of moisture, and when at rest should be kept plunged in a cool house where the pots, without watering, may never become quite dry. In February the bulbs will start into growth in a temperature of 55°–65°, and the delicate stems then begin to show the character of their narrow leaves. The leaves produced by small bulbs or scales are much like the primary leaves of *L. tenuifolium*. It is to be hoped that the stock of this plant, under the tender care of Mr. Downey (who is undoubtedly one of the most skilful gardeners of the day in all delicate operations of plant-culture), will soon be sufficiently increased to enable Messrs. Veitch to send it out. In the mean time let us hope that the islands whence it came may not long remain, as at present, almost a *terra incognita* to naturalists.

Lilium Hansoni

LILIUM HANSONI.

HANSON'S LILY

L. Hansoni, Baker in Journ. Linn. Soc. Bot. xiv. p. 240. 1875 ex hort. Leichtlin.

L. maculatum et *avenaceum*, Moore, Florist, 1874, p. 193. Gard. Chron. 1874, p. 231, f. 47.

L. maculatum, Bot. Mag. pl. 6126.

L. dauricum, Maxim. in Gartenflora, 1865, p. 290, in parte.

Bulbus [illegible] squamis glaucescentibus compactus nitidus. Caulis 3–4-pedalis glaber teres robustus erectus. Folia obtuscula [illegible] inferiora glauca, superiora saturatius viridia, obliqua, [illegible] 2–3 lin. vel verticillum nonnum [illegible] caulis aggregata, patentia sessilia, reliqua sparsa, 4–5 poll. longa, supra medium 8–12 lin. lata, [illegible] angustiora. Racemus 4–10-florus, [illegible] compositi, vel in umbellam congesti, pedicellis erecto-patentibus [illegible] longis, bracteis [illegible] lanceolatis. Perianthium 15–18 lin. longum splendide rubello-aurantiacum, segmentis crassis lanceolato-[illegible] 4–5 lin. latis profunde falcato-revolutis, facies dimidio inferiore purpureo-punctatis, foveola longa glabra profunde excavata præditis. Filamenta 10–12 lin. longa lutea, antheris angustis 4–5 lin. longis, polline flavo. Ovarium clavatum profunde sulcatum 5–6 lin. longum, stylo multo brevius.

Hab. Japonia, hort. Leichtlin. et Wilson. Victoria Gulf, N.E. Manchuria *fide* Max. (comm.). Manchuria [illegible] 43°–45° N. prope in Herb. Kew. [illegible] Japoniæ boreales. Hance.

Bulb [illegible] scaled, composed [illegible] of many closely [illegible] white scales, resembling [illegible] of a Tiger Lily. Stem 3 [illegible] feet high, stiff, erect, bearing 3 or 4 whorls of leaves at considerable intervals, the lowest one some way from the ground. Leaves narrow when many in a whorl, broad when few, sessile, 3–5 inches long by ½–1¼ broad, oblanceolate or elliptic-lanceolate, pointed, 3-nerved, dark shining green above, paler beneath, upper leaves scattered, much smaller. Flowers about 4–10 or more, irregularly racemose; peduncles 2–3 inches long; bracts broad, green, leafy. Perianth-segments 15–18 lines long, orange-yellow, recurving and recurved, but not so much so as in the Martagons, spotted with black within, on the upper [illegible] Anthers 9–12 lines long; filaments narrow, [illegible] ovary clavate, slightly [illegible] style rather shorter. Perfect capsule [illegible]

THIS fine and very distinct Lily is of very recent introduction, having been named by Mr. Baker from a plant Mr. Leichtlin's garden only last year. As its history however is rather an [illegible]ate one, I will give it fully.

The plant was first discovered by Professor Maximowicz, the distinguished Russian traveler in Siberia and Japan, about the year 1860, at the Victoria Gulf in Eastern Manchuria, the southern limit of Russian territory in those regions. He did not, however, especially notice its distinction from *L. avenaceum*, which indeed very slight, so that it is mentioned in the 'Gartenflora,' 1865, p. 290, as a yellow-flowered variety of that plant. In 1868 or 1869 two or three bulbs were sent to the garden of the late Baron von Siebold at Leyden and were purchased a year afterwards by Mr. Leichtlin, who saw at once that [illegible] was [illegible] not [illegible]. He grew the plant and named it after Mr. Hanson of New York, who has [illegible] collections of lilies in the [illegible].

Before this became known, however, Mr. Wilson had bought one or two bulbs in an odd lot at Stevens's sale-rooms, where many thousands of lilies are annually disposed of, not knowing exactly what they were. Early in the following spring he was gratified by seeing a stem shoot up before any other Lily had begun growing, and in due time the flowers were produced. He exhibited the plant in June at a meeting of the Royal Horticultural Society, and it was figured soon afterwards in the 'Gardeners' Chronicle' under the name of *avenaceum*, in the 'Florist and Pomologist' as *L. maculatum*, and in the 'Botanical Magazine,' pl. 6126, as *L. maculatum* (of Thunberg), with the synonym of *avenaceum*.

Mr. Leichtlin, however, on seeing these figures at once recognized the plant, and wrote to point out that though the flowers and stem might be very similar to those of *avenaceum*, the bulb was remarkably different

This I have verified by personal examination, having seen excellent specimens of the latter with bulbs in several herbaria; and though it is not now in cultivation, there can be no doubt that Mr. Leichtlin is right.

The habitat of the plant, however, still remained unknown; for though it is certainly found in Japan, no travellers had met with it in a wild state, and it might be, like several others, only introduced to the gardens of Japan.

A few months ago I was able to show a plant of this species in flower to Professor Maximowicz, who at once recognized it as what he had discovered at Victoria Gulf and previously supposed to be *L. arenaceum*. It is quite possible that the plant may have been known before, as it was certainly sent to America several years ago, and has been again received by Mr. Hanson direct from Japan; but the mystery which hung over its origin has now been, I hope, satisfactorily cleared up.

I may add that the name of *maculatum* (Thunb.), which was thought to have been given to this lily, cannot stand, the type specimen in Thunberg's own herbarium (which, through the kindness of Professor Fries, of Upsala, has been sent to the Kew herbarium for examination) being nothing more than a garden variety of *L. elegans*.

I have seen, in a book of drawings of Japanese lilies very well and truthfully done from nature, by a native artist, unmistakable representations of both *L. Hansoni* and *L. arenaceum*—showing that they are recognized as distinct by the natives of that country, and may both be found in the northern parts of the archipelago.

The culture of this plant is so easy that I have no doubt it will soon become better known in gardens. A small bulb stood the severe frost of last winter in my garden without any protection; and though it does not ripen seed in this country, it may be propagated by means of scales and offsets. It is the earliest in growth of any kind I know, and succeeds well in a peaty soil which does not become hot and dry in summer. The only seed which has been obtained by Mr. Leichtlin germinated at once, which is not the case with the Martagon Lilies, from which this plant is also distinguished by many characters of bulb, habit, and shape of flowers.

P.S. From information I have quite recently received from Mr. Hogo, an American gentleman long resident in Japan, I have no doubt that the plant is found in the northern part of the Japanese archipelago, and I am promised by him a full account of all the lilies of that country in their wild state, about which as yet we have very little knowledge.

LILIUM POMPONIUM.

THE POMPONE LILY

L. pomponium, L. Sp. 434, Bot. Mag. t. 972?, Kunth, Enum. iv. 266, Roem. & Schult. Syst. Veg. vii. 1098, Redouté Lil. t. 29, Gren. & Godr. Fl. France, iii. p. 181, Baker, Journ. Linn. Soc. Bot. vol. xiv. p. 249, Ardoino, Flore des Alpes-Maritimes, p. 378

L. rubrum, Lam. et DC. Fl. Gall. iv. 217

L. angustifolium Mill. Dict. no. 6

Bulbus ovoideus perennis squamis pluribus lanceolatis, 2–3 poll. crassus. Caulis 1½–2½-pedalis. Folia angusta, inferiora ascendentia 3 poll. longa, 1½ lin. lata, marginibus minute papillosis 1–3-nervata. Pedunculus 2–4 poll. infra racemum nudus. Racemus [illegible] flores 12–14 lin. longos, pollinis [illegible] pedicellatos. Perianthium 2 poll. longum, extus [illegible] papillosum et nigro-punctatum, segmentis arcte revolutis oblanceolatis 3–4 lin. latis, foveola glabra [illegible] glabris. Filamenta 12–14 lin. longa, antheris 3–4 lin. longis polline miniato. Ovarium 5–6 lin. longum, stylo [illegible] brevius. Capsula obovoidea, 1½ poll. longa, apice umbilicata sulcata, [illegible]

Hab. Italia borealis et Gallia orientali-meridionalis "Alpibus Maritimis" necnon Junio floreus.

Bulb perennial, ovoid, whitish, smaller than that of *pyrenaicum*. Stem 1½–2½ feet high, stiff, erect, slightly furrowed, [illegible] narrower, very finely but conspicuously ciliate at the edges, apparently white-edged and slightly rerotted. Racemus [illegible] in gardens many-flowered. Pedicels recurved at the tips, sometimes bracteolate. Perianth 1½–2 inches deep, [illegible] 12–14 lines long, anthers 3–4 lines long, pollen red. Capsule obovoid, 1¼ inch long, umbilicate at the end, blunt[illegible] 6-angled.

Loc. Maritime Alps.

THE Pompone Lily, though well known by name, is by no means a common species. I have indeed great doubts if the true plant was known in our gardens until recently, though it was grown in the last century and is one of the oldest known to science.

To Mr. G. Maw, of Benthall, whose frequent excursions to all parts of Southern Europe in search of plants have made his name so well known of late years, must be attributed the credit of reintroducing the true *L. pomponium* of Linnæus, and of pointing out its distinction from the common garden plant of that name. It is true that Mr. Baker, in his last revision of the genus, places *L. pyrenaicum*, the red variety of which is the *pomponium* of gardens, as a variety only of the latter, but I think that if he had at the time seen such a plant as I have figured, in a living state, he would have allowed its claims to specific distinction. I am indebted to Mr. Maw for the plant from which this drawing was made. It was procured by him in the Lantosca valley of the Maritime Alps in 1873 and flowered in his garden at Benthall in June 1875. It may be distinguished from *pyrenaicum* by the numerous crowded, narrow, linear leaves, the very large anthers and warty [illegible] as well as the [illegible] which make it a handsomer plant than any form of *pyrenaicum* I have seen.

[illegible] in a large [illegible] I [illegible] in the Maritime Alps—Lantosca (at about [illegible] above Mentone (at about 3,000 [illegible] La Vesubie (Cruniers) [illegible] Mont St. Maurice (Col de Crous), the Monterin, &c.

[illegible] Martagon group, it only requires to be planted in good soil and left undisturbed, when it will increase rapidly and flower freely every year. I am glad to hear that Messrs. Barr and Sugden have succeeded in obtaining from its native [illegible]

[illegible] but they have invariably turned out to be of the *speciosum* type. I have likewise flowered some seedlings [illegible] from the red-banded seedling *auratum*, making the *speciosum* the male parent, and they have all shown on [illegible]ering the *auratum* shape, but vary much in their markings, some being with red bands and some with yellow [illegible] A [illegible] flowers were [illegible] the anthers being removed before they [illegible] appeared on the [illegible] of the flowers crossed. I have [illegible] flowered between 400 and 600 seedling Lilies of the *speciosum* and *auratum* [illegible] within the last few years; and it is remarkable how they vary in shape of the petals and [illegible]. I have [illegible] two [illegible] with any decided cross between the two kinds. Of the *speciosum* [illegible] I have raised pure white kinds and pink-spotted ones on a white ground, like *speciosum punctatum*, [illegible] a very dark-spotted on a deep crimson ground. In raising seedling Lilies of the *auratum* and *speciosum* kinds it is very easy to see if there is a cross between them, by the shape of the leaves and markings on the [illegible] long before the flowers appear—the leaves of *auratum* being much narrower than those of *speciosum*, and the [illegible]

LILIUM AURATUM, VAR. WITTEI.

WITTE'S LILY

[illegible] Sibthorp Flora Graeca [illegible] Botanical Magazine [illegible] [illegible]

[illegible]

Of this grand [illegible] *Lilium auratum*, var. *Wittei*, I can say little. It was first described by PROF. SURINGAR, of the Botanic Garden at Leyden, as a distinct species, from a plant in the possession of MESSRS. J. VAN DER [illegible] & SON, Rotterdam, who received it from Japan.

It was then purchased by MR. J. H. KRELAGE, of Haarlem, who is probably the largest grower of Lilies in [illegible] whom [illegible] for [illegible] who he has a wide [illegible] knowledge of Lilies and bulbous plants generally, but also for allowing me to have the Plate [illegible] from [illegible] flowering [illegible] bulbs. I [illegible] at the very time that MR. FITCH [illegible] *Lilium auratum*, which I had purchased in the preceding winter among a [illegible] bearing one or more flowers so exactly like the figure of MR. KRELAGE's plant that there can be no doubt of their identity. What has been grown and exhibited, on more than one occasion, [illegible] as *Lilium rubrum*, is, I think, the same, or almost the same, variety; and I am informed by MR. WILSON, of Weybridge, that, out of forty seedlings he raised from *L. auratum*, three produced flowers nearly resembling this. The last fact is a conclusive proof of the specific identity of the plant with *L. auratum*. [illegible] I have [illegible] and [illegible] bulbs [illegible] imported from Japan [illegible] are [illegible] being [illegible] and planted in gardens on purpose for exportation. A full account of *L. auratum*, together with other distinct [illegible]

LILIUM PARKMANNI, HYB.

PARKMAN'S LILY.

[illegible]

[illegible]

L. auratum, but with the colours of *speciosum*. Base of the perianth [illegible] A hybrid between *L. speciosum*, the female, and *L. auratum*, the male parent.

I THINK it unnecessary to give [illegible] description of the [illegible] plant [illegible] figured as [illegible] peculiarities of form and colour are better shown by the Plate than [illegible]

The history of *L. Parkmanni* is as follows. It was [illegible] by Mr. Francis Parkman of Jamaica Plain, Mass., President of the Massachusetts Horticultural Society, who gives the following [illegible] of it in the 'Gardeners' Chronicle' for 1865, p. 366:—

"I sent last year, to Mr. Anthony Waterer a small bulb of a hybrid Lily raised by me between *L. auratum* and a deep coloured variety of *L. lancifolium* (*speciosum*). The latter was the female parent. Impregnation took place readily, and the young bulbs were planted in the open ground for the first time the spring of 1869. There were about fifty of them. Several, as they grew, showed the peculiar spotted stem of the male parent, but when they set flower-buds, as nearly all of them did in the same season, I could distinguish the features of *L. auratum* in only one of them. The rest in bud and flower appeared to be merely *L. lancifolium*, quite unaffected by the pollen of the male parent.

"The one case alluded to was a remarkable exception. The flower opened ten days earlier than any of the rest; its colour was a deep red, it had the fragrance of *auratum*, and resembled it also in form. The [illegible] measured 9½ inches from tip to tip of the petals. In the following year there were [illegible] flowers, [illegible] the largest measured 11½ inches. The bulb was then in a pot. As no pains [illegible] were bestowed on its cultivation, I have no doubt that the flower might be grown to the diameter of a foot.

"This hybrid was the most successful result of a great number of [illegible] tried on the [illegible] fertilization of Lilies. This genus is certainly remarkable in the [illegible] with which it preserves the characteristics of the female parent, and resists the influence of the male. Thus I impregnated *L. longiflorum* and its variety *L. Takesima* with the pollen of *L. auratum*, *L. lancifolium*, and six or eight other [illegible] the anthers of the impregnated flower being carefully removed before they ripened. *L. Takesima* bore seed [illegible] the resulting plant did not differ perceptibly from its female parent, showing no feature of the male. I removed its anthers and fertilized it again with *auratum* and *lancifolium*, thinking that the [illegible] might appear in the second generation if not in the first, but this double impregnation produced no effect. The same result followed a similar experiment with *L. canadense* and *L. superbum*; in this case a sec[illegible] the flowers [illegible] the first impregnation was again impregnated; the result was a very scanty crop of seed [illegible] a plant to which no sign of the male parent was visible."

In 1875 the plant flowered in the celebrated Rhododendron-nursery of Mr. Anthony Waterer at Knaphill, where it was drawn by Mr. Fitch for the 'Florist and Pomologist,' and described by Mr. T. Moore, to whom I am indebted for permission to use that drawing for my work. It is without doubt one of the [illegible] Lilies known, but, I am afraid, will never become common in this country, as the [illegible] of cultivators [illegible] large majority of the bulbs of *L. auratum* makes them very liable to go off suddenly with [illegible] when once out of health, they are very difficult to recover. I am glad to hear that it has [illegible] to the hands of Herr Leichtlin, as, if it is possible for any cultivator to increase it, [illegible] done by him.

With regard to the little-understood subject of hybridization among Lilies, I would here call attention to a communication by Mr. Tillery, of Welbeck, to the 'Gardeners' Chronicle' 1875. He says: "For the [illegible] seven or eight years I have been trying to effect a cross between a dark crimson *L. speciosum* and a scarlet *L. auratum* with a deep-red band, making the *speciosum* the female parent. I have flowered some of the seedlings from the

Lilium Pyrenaicum

LILIUM PYRENAICUM.

THE PYRENEAN LILY

[illegible]

[illegible] Lange, Prod. Flor. Hisp. p. 22.

[illegible]

[illegible]

[illegible] Kaulfuss; foliorum vel [illegible] 6–12. [illegible] Perianthii [illegible] 3–4 poll. longi, interdum bimetrales. [illegible] in communi, saepius [illegible] longe, [illegible] longe.

[illegible] Hispania borealis et Gallia meridionalis, montibus Pyrenaeis. Bosnia (*fide* Cosson. Blow in hort. Berolensi). Transsylvania (*fide* Schur). [illegible] Baq.

[illegible] Stipes [illegible] foliorum sex erecti, regulariter, vel elongatim [illegible] Verticilli pedunculus, 1½–2 pollices longus, [illegible] Filamenta 1 inch long, anthers 3–4 lines; pollen [illegible] sex.

[illegible] Pyrenees, from Mont Louis to Eaux Bonnes. [illegible] Switzerland. Bosnia. Hungary. Siebenbürgen. Roumania. [illegible]

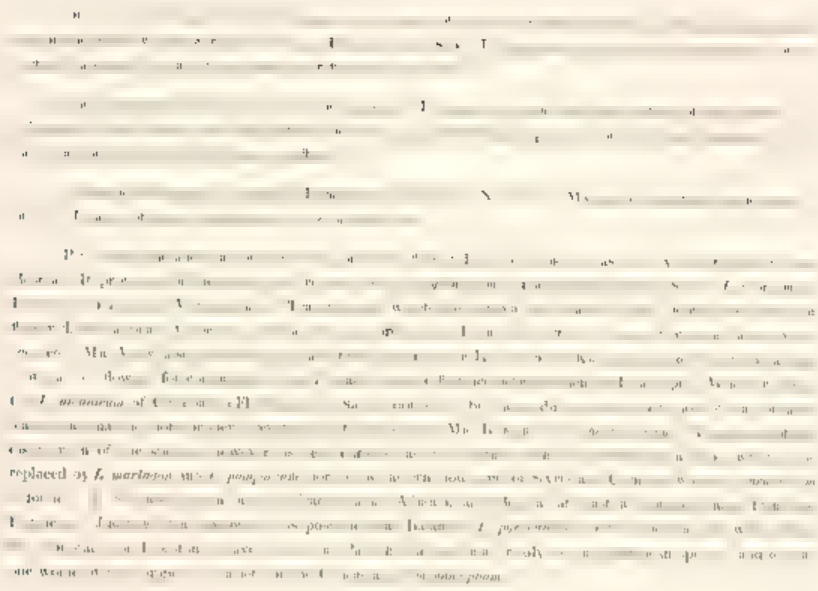
THE Pyrenean L[illegible] of the most [illegible] of the [illegible] all species that we have [illegible] as [illegible] and [illegible] by [illegible] gardeners [illegible] are beautiful species. It has probably been known to botanists and gardeners [illegible] Montpellier in 1713 separated [illegible] bigeneric [illegible]

It appears to be confined to the Pyrenees, on both sides of which range it is found [illegible] from 1,500 to 5000 feet elevation. Willkomm and Lange, in their 'Prodromus Florae Hispanicae,' include *L. pomponium* as found in the Sierra de Burgos; but I think it must be more probably *L. pyrenaicum*.

[illegible]

The plant from which my figure was taken was collected by Mr. Maw at [illegible] 6,000 feet elevation. It flowered in Mr. Wilson's collection at Heatherbank early in June 1874.

[illegible]



LILIUM TESTACEUM.

TLE NANKEEN LILY

Mantagon ground it prefers loam to peat soil and resists the hardest frosts [illegible]. It flowers about the beginning of June, about one month later than the White Lily and about fifteen days earlier than the Scarlet Martagon. The [illegible] are very large, but as there is nothing remarkable about our examples I have not thought it necessary to figure one.

I have recently learnt from my friend Major Trevor Clarke of Warren Place, one of our most experienced and ardent florists, that he has produced a very handsome distinct variety from the [illegible] *testaceum*, by fertilizing *L. chalcedonicum* with the pollen of *L. candidum*. As however he raised them in the same year from seed produced by *L. testaceum*, there is yet a possibility of their having become [illegible], though he has little doubt of the correctness of his statement.

LILIUM DAVIDI.

DAVID'S LILY

LILIUM POLYPHYLLUM.

THE MANY LEAVED LILY

L. polyphyllum, D. Don in Royle's Ill. Him. 383 (1839); Kunth, Enum. iv. 677; Spac. Mon. p. 39; Klotzsch. Reise Wald. p. 53; Baker, Linn. Journ. xiv. p. 2[illegible].

L. pumilum, Jacquem., Duch. Obs. p. [illegible].

L. stolonaceum, Klotzsch. in Herb. Berol.

Bulbus elongatus, paucis squamis compressis, 2–3 poll. longus, 1 poll. crassus. Caulis glaber teres 2–4-pedalis. Folia 40–60 [illegible] glauca [illegible] inferiora oblanceolata 4–5 poll. longa, supra medium 6–9 lin. lata, superiora angustiora lanceolata. Pedunculus infra racemum 6–8 poll. nudus. Racemus laxus 4–10-florus, ramis saepe oppositis, bracteis verticillatis, pedicellis floriferis apice cernuis, inferioribus 2 poll. longis [illegible] bracteis [illegible] ovatis, viridibus, saepe purpureo-[illegible] segmentis obtusissimis [illegible] revolutis. Filamenta 15 lin. longa, antheris 4 lin. longis. Ovarium 6–7 lin. longum, stylo vario [illegible] 18 lin. longo.

Hab. Regio temperata Himalayae occidentalis, alt. 6600–8000 ped. ROYLE, JACQUEMONT.

Bulb long and much narrower in proportion than usual, composed of a few thick compressed scales sharply pointed at the top. Roots very thick, fleshy and wrinkled. Stem 2–4 feet high, glabrous, terete. Leaves many, scattered, or sometimes whorled [illegible] narrowly lanceolate, the lowest oblanceolate, 4–5 inches long, 6–9 lines broad, the uppermost narrower and shorter. Flowers 4–10 in a lax raceme. Peduncle 2–4 inches long, ascending, subtended by a pair of large bracts. Perianth-segments 18–21 lines long, yellowish, with purplish spots, reflexed from the middle. Ovary 5–7 lines long, [illegible] Filaments 15–18 lines. Capsule 1½–1⅝ lines long, rather acutely angled with a distinct neck.

THIS species, the only one of the Martagon group yet found in the Himalayas, is very little known as [illegible]. Discovered forty years ago by Dr. ROYLE, at Tarnuda, in the province of Kumawun, it has since been [illegible] by several travellers in the western part of the range, and was [illegible] but has not been noticed in Nepal. I have reason to suppose that it occurs in Sikkim, and even further east, on the frontiers of China and Tibet, where a plant which I believe to be identical was collected by the Abbé DAVID in 1869.

Of its native haunts we know but little, though a correspondent of Mr. BARR at [illegible] ('The Garden,' Jan. 24, 1874) says—"It grows in good loamy moist vegetable mould [illegible] in rocky rubbishy and flowers here in June, at an elevation of 6500 feet."

It seems to have been first introduced to the Edinburgh Botanic Gardens, where it was raised, according to Mr. McNAB, the Curator, from seed sent from Sikkim. I saw it there in fruit in October 1873, under the name of *L. roseum*, a number of [illegible] given to it by Mr. McNAB. [illegible] to observe two curious facts respecting this species—first, that the germination [illegible] is in some cases at least, subterraneous—that is to say, that the cotyledon does not appear above ground, but, as in the case of *L. monadelphum*, the first sign of growth is a true leaf, the thickened base of whose petiole forms a minute bulb; secondly, that the peculiar shape of the bulb may be distinguished in its earliest stage, so that a three-year seedling of *L. polyphyllum* cannot be mistaken for any other species whose development from seed I have watched.

For the specimen here figured I am indebted to Mr. G. MAW, of Benthall, who was, I believe, the first person to flower the plant in England, and for the drawings of the bulb and capsule to Herr MAX [illegible].

Though a few bulbs have been recently procured from India by Mr. BARR and others, and are believed to be perfectly hardy in this country, the plant is still very rare, and the seedlings which I have raised, though [illegible] years old, [illegible] progress.

Mr. McNAB informs me that he has received from California a Lily apparently undistinguishable [illegible] which he [illegible] received, I [illegible] Himalaya was reappearing in California is so extraordinary, that I am forced to believe, in [illegible] change of labels, or one of those mistakes which are so difficult [illegible] botanic gardens [illegible].

The photograph accompanying this Part is by Messrs. BOURNE and SHEPPARD, of Calcutta, and represents a [illegible] Wangadilla of the North-West Himalaya at [illegible] *Lilium polyphyllum* [illegible].

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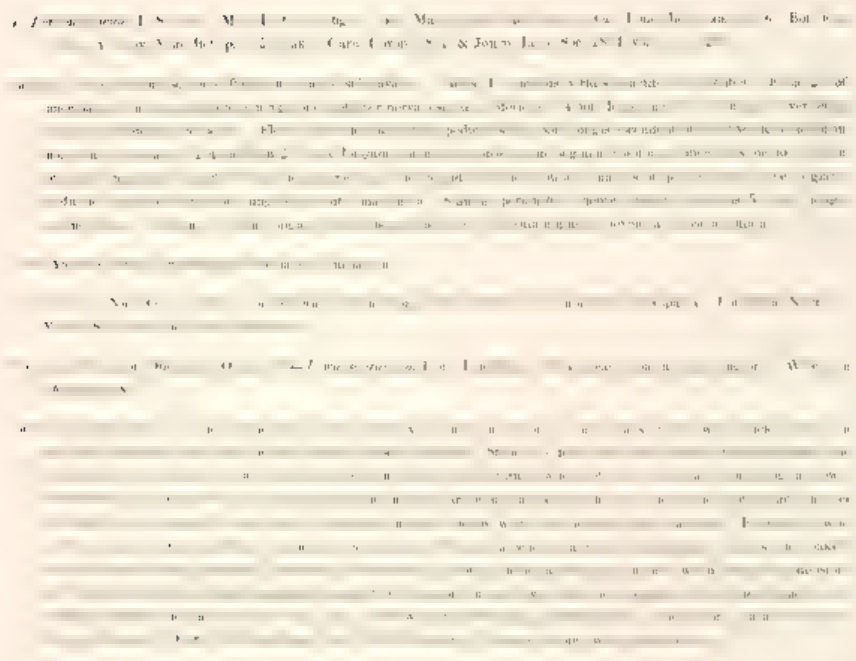
LILIUM GIGANTEUM.

I saw this noble plant growing abundantly in the Lachen Valley, at about 8000 feet [illegible] I [illegible] [illegible] [illegible]

Lilium Philadelphicum

LILIUM PHILADELPHICUM.

THE PHILADELPHIA LILY



[illegible] from [illegible] keeping the [illegible] dry [illegible] The seed germinates readily and grows more quickly than [illegible] I have raised [illegible] offsets. I think this would be a good means of propagation [illegible]

The growth of the [illegible] annual, with *I. aequinoctiale*. It is a curious [illegible] fruticosa, differ [illegible] is noticeable among the American fritillaries, which [illegible] white scales loosely attached to a sound central axis, from [illegible] and fritillaries only two, namely *Lilium dauricum* and *Fritillaria kamtschatcensis*, resemble the American congeners in the formation of their bulbs and not of their [illegible] scores of North-eastern Asia, which have many affinities, both botanical and zoological, with the flora of North America

Fig 3
Fig 2
Fig 1

LILIUM DAVURICUM.

THE SIBERIAN LILY

L. Davuricum, Red. Lil. t. 210. Redouté, Liliacées, t. 74. Ker, Bot. Reg. t. 873. Sweet, Brit. Flow. Gard. ser. 2, t. 208. Baker, Lilium, p. 108. Wallich, Cat. no. 4318. Maximowicz, Bull. Acad. Imp. Sci. St. Petersbourg, xv. 1870, p. 253.

L. pumilum, Redouté, Lil. t. 211. Bot. Mag. t. 857. Curtis, Bot. Mag. n. s. t. 8.

L. Pumilum, Loddiges, Botanical Cabinet, t. 1618. Paxton, Mag. of Bot. & Nat. Hist. Flow. Pl. iv. 58. Redouté, Liliacées, t. 74.

Stem erect, simple, glabrous, purplish, leafy, 1 to 2 feet high. Leaves scattered, linear-lanceolate, 2 to 3 inches long, about ¼ inch broad, acute, glabrous, dark green, 3-nerved, the lowest sometimes whorled. Flowers 1 to 3, erect, terminal, sessile, surrounded by a whorl of leaves. Perianth-segments 2 inches long, ¾ inch broad, oblong-lanceolate, acute, erect, bright orange-red, with a few dark purple spots in the middle. Stamens erect, shorter than the perianth-segments; filaments dilated at the base, glabrous; anthers linear, versatile. Ovary oblong, glabrous; style erect, glabrous, as long as the stamens; stigma 3-lobed. Capsule 1½ inch long, oblong, obtuse, 3-angled, many-seeded.

Native of Siberia, Japan, and Manchuria.

Plate [illegible] represents a plant which I have received from Messrs. Veitch under the name of *L. Davuricum*, and which appears to be nearly connected with the plant figured by Redouté, Lil. t. 210, as *L. Davuricum*, but differs from it in having the leaves more scattered, and the flowers more numerous. Plate [illegible] represents a plant which I have received from Messrs. Veitch under the name of *L. pumilum*, and which appears to be identical with the plant figured by Redouté, Lil. t. 211, as *L. pumilum*, and by Sweet, Brit. Flow. Gard. ser. 2, t. 208, as *L. Davuricum*. Plate [illegible] represents a plant which I have received from Messrs. Veitch under the name of *L. Pumilum*, and which appears to be identical with the plant figured by Loddiges, Botanical Cabinet, t. 1618, as *L. Pumilum*, and by Paxton, Mag. of Bot. & Nat. Hist. Flow. Pl. iv. 58, as *L. Davuricum*. Redouté, Liliacées, t. 74, figures both forms as varieties of *L. Pumilum*.

The Siberian Lily is a very variable species, as is evident from the figures and descriptions of the various authors who have described it. Both forms are [illegible] and both are [illegible]. The [illegible] is very [illegible]. The [illegible] is [illegible] and the [illegible] is [illegible]. The [illegible] is [illegible] and the [illegible] is [illegible]. The [illegible] is [illegible] and the [illegible] is

[illegible] of the influence of foreign [illegible] from the Journal of the Roy. Hort. Soc. into the 'Garden,' Feb. 1, 1873, p. 86. Prof. Maximowicz [illegible] early the peculiar formation of the bulb of this species. He then describes his experiments in fertilizing *L. dauricum* [illegible] with the pollen and crossing [illegible] *L. medeoloides* [illegible] the seed-vessel [illegible] *L. dauricum* a capsule closely resembling that of *L. bulbiferum* whilst *L. bulbiferum* fertilized with the pollen of *L. dauricum* produced the capsule of the male parent.

Now this fact, if it could be really verified, would be a most remarkable one; but it is so contrary to the experience of many persons who have attempted to hybridize lilies (see under *L. Parkmanni*), that I cannot help supposing that there must be some error in the statement.

From what I have seen myself, I believe that very much dependence cannot be placed on the form or size of the capsules produced in cultivation. It happens that [illegible] does not take place, and more often that the vigour of the plant is not sufficient to enable it to mature or even swell the whole of the capsule, in which case its shape is very different from what it should be. Whether the difference between the capsules of these plants in a wild state is really constant I am unable to decide, from the absence of mature specimens, as I have never seen or been able to procure a perfect capsule of *bulbiferum*, and the only supposed one existing in the Kew Herbarium, being from Corsica, is more likely to belong to *L. croceum*. The capsules of *L. elegans*, which I have seen, differ conspicuously in having the apex flat.

I was at one time inclined to believe that the plant shown in fig. 2, which is undoubtedly Gawler's *L. dauricum*, was different from the one described by Dr. Regel, as the articulation of the bulb-scales (*vide* fig. 3) which both he and Prof. Maximowicz regard as one of the distinctive characters in their Siberian plant, is, as far as my experience goes, not visible in the old cultivated strain, which has, however, a creeping habit (*vide* fig. 2). Long cultivation may have had the effect of causing this difference, though it does not seem to have improved the size or solidity of the bulb, which is always fragile and delicate; but there is no difference [illegible] in the [illegible] seems [illegible] of the two varieties.

Gawler writes of it in 1809, "It has now been cultivated in our gardens for at least sixty years, during which time it has maintained its appearance and habits. It is very shy of flowering, never produces more than two flowers, and rarely more than one, hardly ever a perfect pistil, but a profusion of offsets, which never are [illegible] that of a man [illegible] to us the appearance of having been drawn [illegible]."

The Siberian [illegible] extends from [illegible] to about 105° [illegible] through Manchuria and the region of the Amoor to the islands of Saghalien and Yesso, where it has been found by Prof. Maximowicz [illegible].

I am indebted to Mr. Bull for the plant shown in fig. 1, which was received by him from St. Petersburg.

LILIUM CROCEUM.

THE ORANGE LILY

own country. Hitherto the season of flowering has always been [illegible] when I was observing a valley full almost of bulbs of this Lily, each [illegible] differ from all the *L. bulbiferum* and *L. elegans* also agree to some extent with *L. dauricum*, that is with the very few bulbs that grow singly and throughout the whole of the stem and throughout the whole of the stem and throughout the whole of the stem

LILIUM CARNIOLICUM.

THE CARNIOLIAN LILY

L. Carniolicum Bern. ex Mert. & Koch Deutsch. Flora. — Koch Enum. p. 706. Bot. Mag. t. 1. Flor. Germ. 780. Fl. Austr. 68. Baker *Journ.* Linn. Soc. 871 xv. p. —

Lilium Pyrenaicum Lois. Sp. Plant. Ed. 2. vol. 1. Jacq. Fl. Austr. Supp. t. 270.

Var. rosea, petalis intus rubro-punctatis, stylo longo.

Hab. Carniola, Carinthia, Styria. From a bulb sent to Mr. Sweet.

The Carniolian Lily is a native of the mountains of Carniola, Carinthia, Styria, and Austria, where it grows in woods and thickets, and flowers in June and July. Its bulb is composed of numerous ovate scales, and is about the size of a hen's egg. The stem is from two to three feet high, and bears from six to twelve flowers, which are nodding, and of a pale yellow colour, with a few purple spots on the inside of the petals. The leaves are lanceolate, and are arranged in whorls round the stem. The flowers are produced in June and July, and are succeeded by capsules containing numerous seeds. The bulb is eaten by the inhabitants of the countries where it grows wild. The specimen from which the above figure was taken was received from Messrs. Haage and Schmidt, of Erfurt, in the autumn of 1871, and flowered in the following July.

The Carniolian Lily is closely allied to the Martagon Lily, but is a smaller plant, and has fewer flowers, which are of a paler colour, and have the petals more spoon-shaped, and the spots on the inside of the flower smaller. It also flowers about a month later than the Martagon. Linnæus considered it a variety of *L. Pyrenaicum*, but it is now generally regarded as a distinct species.

In a wild state the flowers of the Carniolian Lily are sometimes of a dull orange-colour, and sometimes of a pale yellow, and are spotted with purple. Mr. C. Copeland, of Ipswich, has a variety with flowers of a pale yellow colour, which he received from Carniola. Another variety, *L. pyrenaicum* Baker, has the flowers smaller, more numerous, and of a deeper orange-colour, and the stem is more slender and leafy. This variety appears to be the one described by Linnæus.

Mr. C. Copeland has a number of roots of this lily. Mr. Sweet received his bulbs of the same from Carniola, and Messrs. Haage and Schmidt received theirs from Carinthia. Mr. Copeland's bulbs were received from Messrs. Haage and Schmidt in November, 1870, and flowered in July, 1871. The following are the names of the localities in which the bulbs were found: Carniola, Idria, Laibach, Tarvis, Veldes, Neumarkt, Krainburg, Feistritz, Wippach, Adelsberg, Nanos, and the Monte Santo di Gorizia. Mr. Copeland has not received bulbs from any part of Carinthia or Styria, but from the fact that the Styrian Alps form the northern boundary of Carniola, it is probable that the bulbs sent to Messrs. Haage and Schmidt were collected in Styria.

In Western Asia, Lilium Szovitsianum, Fischer, Lilium Monadelphum, Bieberstein, Lilium Kesselringianum, Zuccarini, Lilium Pomponium, Linnæus, Lilium Carniolicum, Moench, Lilium Martagon, Linnæus, Lilium Pyrenaicum, Gouan, Lilium Chalcedonicum, Linnæus, Lilium Pilosiusculum, Freyn, Lilium Polyphyllum, Don, Lilium Ponticum, Gay, and Lilium Monadelphum, Bieberstein, are found in Armenia, Caucasus, Persia, and Asia Minor.

Lilium Martagon, Linnæus, is found in Europe, Northern Asia, and Siberia, from 45° to 60° N. lat., and from 0° to 120° E. long.

LILIUM CANDIDUM.

THE WHITE LILY

L. Candidum—Linn. Sp. 433; Bot. Mag. t. 278; Redouté, Li. t. 199; Bury Hexand. t. 38; [illegible]

Bulbus ovoideus perennis albidus vel flavescens. Folia primordialia hiemalia sessilia oblanceolata, 5–7 poll. longa, 1½–2 poll. [illegible]

[illegible]

[illegible]

[illegible]

[illegible] 1½ 2 inches broad. Stem 3–4 [illegible] dark [illegible] Flowers 5 or 6 to 20 in a thyrsoid raceme. [illegible] spicuously erecto-patent, the lower ones 2–3 inches long naked or bracteolate. [illegible]

[illegible]

[illegible]

[illegible]

This White Lily [illegible] known and [illegible] except a few [illegible] It is [illegible] in abundance [illegible] feet and 300 [illegible] *candidum* forms one of the most [illegible] [illegible] [illegible] heavy.

[illegible] almost any soil or situation, a good deep loam being, however, the one most favourable to its development. There is a very beautiful variety called [illegible] has [illegible] [illegible] very handsome [illegible]

[illegible] Leonard Mapp, a German botanist and traveller of [illegible] met with it in Syria. It [illegible]

LILIUM TENUIFOLIUM.

THE NARROW-LEAVED LILY

L. Tenuifolium. Fisch. Bul. Sem. Hort. Gorenk. 1 . 8. Schultes S. Syst. Veg. v. 10. Kunth. Enum. v. 5. 268. Bot. Mag. t. 1130. Sweet Brit. Flow. Garden. ser. 2. Baker J. in Bot. Mag. t. 5750.

L. pumilum. Pl. in Red. Lil. t. 97. Kunth. Enum. 2. Bot. Reg. t. 12. Lodd. Bot. Cab. t. 1758.

L. Heterophyllum. Hornemann. Hort. Hafn. 1. 420.

L. pumilum. Siebold. de Vriese. Ann. Hort. Pays-Bas. 1862. 9.

The bulb is small, perfectly white, composed of numerous ovate scales. Stem 1 foot to 1½ feet high, slender, smooth, angular, leafy. Leaves scattered, linear, 2 inches to 3 inches long, ¼ inch to ½ inch broad, acute, smooth, dark green, the lowest whorled, the upper alternate. Flowers 1 to 3, nodding, in a terminal raceme. Peduncles 2 inches to 3 inches long, smooth, angular, bearing a single bract at the base. Perianth 2 inches to 2½ inches long, bright orange-red, the segments lanceolate, acuminate, obliquely spreading, the outer ones rather narrower than the inner. Filaments glabrous, dilated at the base, the outer ones 1 inch long, the inner ones ½ inch long. Anthers oblong, versatile. Ovary 3 lobed, glabrous, ½ inch long. Style glabrous, 1 inch long. Stigma 3 lobed, recurved.

Obs. Several bulbs of this species were received from Messrs. Veitch of Exeter in the autumn of 1862, and flowered in the following July. Stem 1 foot to 1½ feet high, slender, smooth, angular, leafy. Leaves scattered, linear, 2 inches to 3 inches long, ¼ inch to ½ inch broad, acute, smooth, dark green, the lowest whorled, the upper alternate. Flowers 1 to 3, nodding, in a terminal raceme. Peduncles 2 inches to 3 inches long, smooth, angular, bearing a single bract at the base. Perianth 2 inches to 2½ inches long, bright orange-red, the segments lanceolate, acuminate, obliquely spreading, the outer ones rather narrower than the inner. Filaments glabrous, dilated at the base, the outer ones 1 inch long, the inner ones ½ inch long. Anthers oblong, versatile. Ovary 3 lobed, glabrous, ½ inch long. Style glabrous, 1 inch long. Stigma 3 lobed, recurved.

The Narrow-leaved Lily is the smallest and most delicate of all the Martagons. It is described by [illegible] as a native of [illegible]. It has been known in cultivation for nearly a century, but has never been a common one, and is now rarely met with. The bulbs are imported from [illegible] in the autumn of each year, and flower in the following July. It is a native of [illegible] and Northern China, where it grows in [illegible]. Dr. Maximowicz, who has described it in the Mémoires de l'Académie de St. Pétersbourg, 1859, and from whose description the above is taken, says that it is found in [illegible] and [illegible]. Dr. Regel, in the Gartenflora, 1860, p. 129, says that it is found in [illegible] and [illegible]. Siebold and Zuccarini, in the Abhandlungen der Akademie der Wissenschaften zu München, 1842, p. 1, say that it is found in [illegible]. Dr. Hooker, in the Botanical Magazine, t. 5750, says that it is found in [illegible]. Mr. Baker, in the Journal of Botany, 1863, p. 1, says that it is found in [illegible].

In our gardens the Narrow-leaved Lily is one of the most beautiful of the Martagons. The flowers are [illegible] and [illegible] in number, and are produced in great abundance. The plant is [illegible] and [illegible] in cultivation, and [illegible] in the open ground. It is [illegible] and [illegible] in the greenhouse. The bulbs are [illegible] and [illegible] in the autumn. The plant is [illegible] and [illegible] in the spring. Mr. Wilson, in the Botanical Magazine, t. 1130, says that it is [illegible] and [illegible].

The [illegible] of this species have been [illegible] from [illegible] in the [illegible] of [illegible] and [illegible].

and though it is not generally known or practised in England, the process is a very simple one. Fresh seeds of *L. tenuifolium* will germinate very easily and quickly and, properly treated, produce flowering bulbs in three years.

At the far-famed nursery of MR. LOUIS VAN HOUTTE, at Ghent, I have seen a bed containing many thousands of this Lily, all raised from seeds, which surpassed in health and vigour any of the same species I have seen elsewhere.

It appears to grow best in a light and sandy, though cool and moist soil, and is very apt to die after flowering strongly. I am, indeed, inclined to think that the bulbs of this Lily are not truly perennial, and perish from the mere act of reproduction by seed, like those of *L. giganteum*. This, however, may not be their habit in native or even in all parts of England. The Lily called *pumilum* by VON SIEBOLD, which was introduced by him from Japan, is, in MR. LEICHTLIN'S opinion, merely a reduced form of *tenuifolium*. It does not appear to be common in Japan, if, indeed, it is indigenous, as I have seen no specimens in any herbarium.

The bulbs of this Lily which are imported from Russia have a somewhat different appearance from the one shown in the Plate, the scales being longer, thicker, and less numerous. They are scored into various beds, but these details will be best shown by woodcuts at the end of my work.

Lith. in Chalcedonicum

LILIUM CHALCEDONICUM.

THE SCARLET MARTAGON LILY

L. Chalcedonicum, Linn. Sp. Plant. 434, ex parte Gawl. Bot. Mag. t. 30 Red. Lil. t. 276, Reich. Ic. Germ. t. 993, non Jacq. Syn. Mant. Baker, Journ. Linn. Soc. Lond. Bot. xv. p. 2

L. rubrum byzantinum sive Martagon constantinopolitanum, Park. Parad. 4

L. byzantinum maximum rubrum, Moris. Pl. s.

Bulb [illegible] Stem [illegible] Leaves [illegible] Flowers racemose 1 l'eflorus, pedunculus apice cernuus, sepe bracteolatis. Perianthium inotorum 1½ 2 po[illegible] Petalorum [illegible] Filamenta 1⅜–1¼ lin. longa, antheris 4–4½ lin. longis, polline minuto. Ovarium 5–6 lin. [illegible]

[illegible]

Bulb large, globose, of an orange-yellowish colour. Stem erect, stout, 3–4 feet high. Leaves many, scattered, 3 5-nerved, and [illegible] Flowers [illegible] Perianth [illegible] Filaments [illegible] Anthers [illegible] Ovary [illegible]

THE Chalcedonian or Scarlet Martagon [illegible] of [illegible] lands, [illegible] Persia or Mount Taurus at 2000–3000 feet [illegible] on Mount Macevo at 4000 feet, but I have no certain [illegible] in Turkey or Asia Minor. Bauhin [illegible] in the [illegible] mountains [illegible] it was well known to Clusius, Parkinson, [illegible]

Now, however, owing to the complete revolution in the arrangement of our flower gardens, which has driven so many old favourites out of notice, the Scarlet Martagon, though one of the most [illegible] and [illegible] is [illegible] known.

It seems to prefer heavy rather than light soil, and will luxuriate in moist rather cool corners where [illegible] Deep shade, however, is not very congenial to it, and it is more seriously affected by [illegible] than [illegible]

There are as far as I know [illegible] of the [illegible] Martagon, [illegible] the common sort, and the wild plants which I have seen imported [illegible] smaller and fewer-flowered, are very similar to those which have been perhaps for centuries [illegible] I have never seen a double-flowered form, which is spoken of in terms of great admiration [illegible] that [illegible] I [illegible] rather [illegible] very [illegible] generally known [illegible]

The [illegible] Mr. Baker in the 'Linnean Journal' as *L. albanicum* of Grisebach [illegible] zeno[illegible] Nat[illegible] [illegible]

L. Lilium brown

LILIUM BROWNI.

BROWN'S LILY

L. Brownii Miscellaneous Account of Japan. Bot. Gaz. [illegible] Spec. Mon. [illegible] Icon. Plant. [illegible]

L. Brownii Miscellaneous Account of Japan. Ann. Mus. Lug. Bat. iii. 157. Reich. [illegible]

L. [illegible]

L. [illegible]

[illegible]

[illegible]

[illegible]

This fine plant was introduced into Europe from China [illegible] as 1804, by Capt. [illegible] of the East India Company's service, who had brought it from Canton. It was subsequently cultivated in England [illegible] applied to it the name *japonicum* [illegible] as but recently [illegible] applied to the same species the name of *Brownii*. By which it is now generally known in gardens, and which was first published by Mr. [illegible] after a collection of specimens in which Captain Brown [illegible] 1804.

A specimen of *L. Brownii* [illegible] Chinese [illegible] in the Kew Herbarium, gathered by Mr. Oldham [illegible] to the specific name [illegible] Annie Davis in the mountains of [illegible] *L. Brownii* [illegible]

[illegible] *Chinese* [illegible] *L. Brownii* [illegible] *Brownii* [illegible]

[illegible]

[illegible]

From what I have seen of its cultivation on the continent, where it is largely grown by some of the Dutch and Belgian nurserymen, and at Berlin, where it is annually sold by thousands, I imagine that a very light soil is necessary to its well being. In the late M. Van Houtte's nursery at Ghent there was a bed of it in great perfection, many of the plants bearing two or three stems each; the soil is little better than sand enriched with manure. In Messrs Osborn's nursery at Fulham I have been told it used to thrive, but, though perfectly hardy, one rarely sees it doing well in our gardens.

I have never been able to procure a perfect capsule, but I am informed by Herr Ascherson that the seed germinates quickly, as in all the *Epilobium* group, and will probably flower in the fourth or fifth year of growth.

The purple colour on the outside of the flowers of *E. hirsutum* varies in depth according to the amount of light the plant has received, and is not so dark when growing in a shady place. My figure was taken from a plant grown by Col. Trevor Clarke, of Welton Place, which flowered early in July 1876.

Lilium monadelphum

LILIUM MONADELPHUM.

THE CAUCASIAN LILY

Though introduced by Messrs. Loddiges early in this century, it has not become common until the last few years when it has been imported from [illegible] Being a very variable species, it has been described and figured under several different names by various authors and though the varieties are fairly distinct yet they run into each other so closely, that I think best to follow the high authority of Mr. Baker in considering them as varieties only.

The plant was first described by the Russian Botanist Marschall von Bieberstein, having been found in the Caucasus when those mountains were first explored by Russian naturalists. By Ledebour it was considered the same as *L. pyrenaicum*, and though that opinion may seem ridiculous when a fine and well-grown plant is examined, yet one of the varieties, which Mr. Baker has distinguished as var *Ledebouri* is but little different from the Pyrenean plant.

The [illegible] does not appear to me to be in any consistent or reliable character. The varieties [illegible] of the plant, some having long filaments united for at least one third of their length and others [illegible] at the base or [illegible] is more common in the variety called *Szovitzianum*) to [illegible]

The plant described as *L. pontieum* by Prof. Carl Koch, of which I have seen the type specimen in the Berlin Herbarium, does not appear to me to be in any way separable from this species. The living plants cultivated in the Berlin botanic [illegible] are also [illegible] and I am confirmed in this opinion by [illegible] of Professor Koch himself. There is, however, in Lazistan (the mountainous region at the S.E. angle of the Black Sea) a much smaller and possibly distinct plant, collected by Balansa, and distributed in herbaria by M. Boissier as *L. pontieum*.

As far as I can learn, the variety *monadelphum* (which is here figured from a plant which flowered in my garden in June 1875, and produced in 1876 twenty-nine flowers on one stem) is confined to the northern and eastern parts of the Caucasian region, whilst the variety *Szovitzianum* (of which a plate will be given shortly) is only found on the southern slopes of the mountains in the provinces Imeretia, Mingrelia, and Georgia.

I would here point out that, though I am not at all confident that these two forms can in all cases be well separated, yet as a rule, they may be distinguished by several characters, among which the colour of the pollen, which is red-brown in *Szovitzianum* and [illegible] in *monadelphum* is the most conspicuous. *Monadelphum* is also from a fortnight to three weeks earlier in flower, and when first showing above ground, (usual) has its flower-buds exposed, whereas in *Szovitzianum* they are concealed by the leaves until the plant is just ready to flower.

LILIUM JAPONICUM.

KRAMER'S LILY

L. japonicum. Thunb. Fl. Jap. 233

L. Krameri. Hook. fil. Bot. Mag. t. 6058. Baker, Linn. Journ. vol. xiv. p. 230.

L. [illegible]-donna. Baker, Linn. Journ. xiv. p. 230.

L. Elizabethæ. Hort. Leich.

Bulbus perennis, parvus, pyriformis. Caulis 1 3-pedalis, gracilis, teres, glaber. Folia distantia, sparsa, lineari-lanceolata, acuminata, brevissime petiolata, firma, viridia, 3–5-nervata, 3–6 poll. longa, 6–9 lin. lata. Perianthium suavcolens, horizontale, late infundibuliforme ad oblata vel roseum, 4–7 poll. longum, e basi ad collum sensim ampliatum, segmentis oblanceolato-oblongis, flore expanso, triente superiore falcatis supra medium, exterioribus 10–15, interioribus 15–20 lin. latis. Filamenta perianthio subduplo breviora, antheris 8–9 lin. longis, polline rubro. Ovarium 1 poll. longum, stylo leviter declinato, duplo brevius. Capsula obovoidea, obtuse angulata, 1½ poll. longa.

Hab. Japonia (Thunberg, Maximowicz).

Bulb small, about 1–2 inches thick, pyriform, whitish. Stem 1–3 feet high, erect, glabrous. Leaves scattered, linear-lanceolate acuminate, shortly petioled, 3–5-nerved, 4–6 inches long, 6–10 lines broad. Flowers 1–5, white or rose-colour, red, sweet-scented. Perianth 4–5 inches long, shaped like that of *L. auratum*. Filaments white, the anthers shorter than the perianth; anthers large, with red pollen. Ovary 1 inch long, style slightly declined, capsule bluntly angled, about an inch and a half long.

THE charming Lily here described has a curious history, and affords an additional proof of the necessity of studying such plants from living rather than from dried specimens. When introduced to Europe a few years ago it was considered a new species, and figured as such in the 'Botanical Magazine.' Professor Maximowicz, on seeing the plant in flower at Mr. Wilson's in 1875, told me that it was known to him in Japan, and had been regarded as *L. japonicum* of Thunberg. To make this certain, Mr. Baker was good enough to procure, through the kindness of Prof. Areschoug, of Upsala, the specimens of Lilies collected by Thunberg in Japan, after examining which we both agreed that the original plant named *japonicum* by him was identical with what had hitherto been known as *Krameri*, and not, as was supposed, with *L. Brownii*.

I have little doubt that the Lily described as *L. belladonna*, from a drawing made by Mr. Hanson of New York, and kindly sent me by him, must also be referred to this species, for though I have not seen the plant from which the drawing was made, I have seen forms of *L. japonicum* very closely resembling it. Both *L. Krameri* and *L. belladonna* have been supposed to be hybrids, but from what I can learn about the plant in its native country, I think there is little doubt that it is a distinct species, occurring abundantly in some parts of Southern Japan.

Professor Maximowicz did not see it himself in a wild state, but had it brought him from a considerable elevation in the mountains of Senano, in the island of Nippon; and Mr. T. Hogg, an American gentleman who has sent home large quantities of bulbs of this plant, says that it grows wild near Lake Biva, on the hills of Kioto, in South-west Japan.

Until 1876 it was, owing to the difficulty of importing its small and rather delicate bulbs alive, one of the rarest Lilies in our gardens, but large importations having been received in first-rate condition during the last two seasons, it has been sold at a more moderate price than formerly, and has become better known. If healthy bulbs can be procured, there seems to be no particular difficulty about growing them, though I must confess that no one has, to my knowledge, rivalled Mr. Wilson in his successful treatment of this Lily.

In [illegible] it attains a height of 3 feet, or even more, and produces one to four or five flowers of a great size and beauty; but more commonly, in my own garden, it assumes much dwarfer proportions, as

the variety distinguished by Mr. Baker as *Harrisiana*. If cultivated under glass, it should be treated exactly like *L. auratum*, but it may be grown and flowered out of doors with success. Its propagation at present is little understood, as offsets are not produced freely, and the seeds, if obtained, seem to lie a year in the ground before germinating.

At the Vienna Exhibition in 1874 a large collection of Lilies was sent by the Japanese Commissioner from the Royal Gardens at Miaco, accompanied by excellent drawings from nature. Among them were several forms of *L. japonicum*, varying considerably in size, form, and colour. One of the most beautiful of these (which I saw flowering in Herr Leichtlin's garden in 1875 under the name of *L. Elizabethæ*) was a large pink-flowered form resembling the one which I have figured, and it is possible that some are hybrids between *L. japonicum* and *L. auratum*, which is nearly allied to it.

The plants here figured are the rose-coloured and the white variety, and were both drawn at Mr. Wilson's residence in June 1876. The outline of a petal of a singular laciniated form [illegible] this malformation is probably not permanent. In the 'Gardeners' Chronicle' for August 11, 1877, Mr. J. L. Karlage, of Haarlem, mentions a fine purple-flowered variety in his garden, which I have not as yet [illegible] elsewhere.

Lilium martagon var. dalmaticum

LILIUM MARTAGON.

THE MARTAGON LILY

Martagon Sp. Pl. ed. Jacq. Austr. t. 351 Mor. Mag. t. 634 Bot. Mag. t. [illegible] Reichb. Germ. t. [illegible]

[illegible] purpureo maculata. Folia in verticillos 3–4-, 6–9-natos disposita, superiora sparsa horizontalia oblanceolata spathulata [illegible] cinerea, inferiora 4–6 poll. longa, supra medium 12–15 lin. lata, costa venis distinctis utrinque 3–5 distantibus pluribus subtilioribus conspicuis. Racemus laxus elongatus, 8–20-florus; bracteis parvis pedicellis brevioribus. Flores cernui, infimi 1–3 poll. longi. Perianthium marcescens, vinoso-purpureum, 15–18 lin. longum, [illegible] segmentis lanceolatis [illegible] fovea profunde excavata margine papilloso, apice cucullato crasse pubescens. Filamenta 8–10 lin. longa, antheras duplo excedentia, polline rubro. Ovarium 5–6-lineare, styli valde declinati basi tertia parte longitudinis. Capsula turbinata [illegible] apice umbilicata.

Hab. Prope [illegible] Sibiriam.

L. hirsutum. Mill. Dict. no. 10 (*L. Mollere*, Schultes, Obs. 67), est forma robusta caule puberulo.

L. glabrum, Spreng. Syst. v. 62, est forma floribus nibis caule glabro foliis nitide viridibus petalo luteo. Adsunt formae floribus [illegible]

[illegible] Vienna. Fl. Italica Suppl. [illegible]

L. dalmaticum. Fl. des Serres. 213.

Segmenta perianthii [illegible] bracteis duplo [illegible]

Hab. Alpes Dinaricae.

[illegible] pointed, yellowish. 1 3 inches thick. Stem 3–6 feet high, erect, terete, pubescent or glabrous. Leaves in whorls of 9, with a few scattered ones below the flowers, spreading horizontally, glabrous or slightly downy beneath. Flowers 20 or [illegible] in a narrow pyramidal raceme; lower pedicels [illegible] inches long, drooping at apex not bracteolate, but having a pair of bracts at the base. Perianth 15–18 lines deep, usually dull purplish red, profusely spotted, but varying with white and flesh-coloured flowers. Ovary 5–6 lines long, style slender, 8–9 lines long, curved from the base; filaments as long as style, much curved; pollen reddish. Capsule turbinate, acutely angled, 1 inch long.

THE Martagon Lily is so well known to every one that it is hardly necessary to [illegible] It has been so long in cultivation that we have no record of how and when it was introduced. It may perhaps be indigenous to this country, though more probably, where found in an apparently wild state, it has escaped from cultivation. It is found all over Western, Central, and Eastern Europe to Siberia, as far north as lat. 61 [illegible] Caucasus and Ural Mountains, growing usually districts in meadows or on the borders of woods among long grass up to an elevation of 5000 or 6000 feet.

The varieties of *L. Martagon* are numerous, but as far as I know, only two are found in a wild state, namely—*L. hirsutum* of Miller's 'Garden Dictionary'=*L. Mollere*, Schultes, which is figured in the Bot. Mag. p. 893, and is found wild, according to Professor Karl Koch, in the Hartz Mountains and Thuringia; and secondly *L. glabrum* of Sprengel's Systema Vegetabilium, figured by Jacquin in the 'Flora Austriaca,' and seen in the Bot. Mag. pl. 1634. This is the one most commonly seen in gardens, and is the kind generally found in Switzerland.

The White Martagon, of which I have given a representation on the Plate, is another very pretty variety [illegible] where it probably originated. There are also many others, varying more or less in colour and spotting, which are occasionally seen at the present time, but were much better known two centuries [illegible] Paradisus,' 31, where a long account of them is given.

The very distinct variety of this plant usually called *dalmaticum*, though it had been previously described under the name of *Cattanea*, was hardly known to cultivators until 1875, when it was introduced [illegible] by the agency of Herr Max Leichtlin [illegible]

Lilium superbum

LILIUM SUPERBUM.

THE SWAMP LILY

L. superbum. L. Sp. 434. Bot. Mag. t. 930. Red. Lil. t. 103. Flore des Serres, t. 1014-15. Asa Gray Man. p. 532. Baker Linn. Journ. xiv. p. 242.

Bulbus breviter stoloniferus, annuus, squamis albis imbricatis. Caulis 3–5-pedalis, robustus, glaber, purpureo tinctus. Folia in verticillos 3–4 8–15-foliatos disposita, anguste oblanceolata, acuta, firmula, sordide viridia, glauca, 3–5-nervia, [illegible] 4–6 poll. longa, medio 6–9 lin. lata. Flores 6–50 in paniculam oligodeum 8–20-pollicem [illegible] cernuos, inferioribus 3–5 poll. longis, divaricatis. Perianthium 3–4 poll. longum, splendide rubro-aurantiacum [illegible] apice sæpe luteis, medio 6–9 lin. latis, profunde revolutis, dimidio inferiore punctis sinosis decoratis, paullulum tunctis: fovcola impresso marginibus glabris præditis. Filamenta 2 2½-pollicaria, valde divergentia, antheris rubellis, 6–9 lin. longis. Ovarium 9–12 lin. longum, stylo declinato paulo brevius. Capsula obovoidea, obtuse 6-angulata.

Hab. A Canada ad Carolinam, in locis uliginosis.

Bulb consisting of white pendulous imbricated scales and the end of a short stolon. Stem [illegible] Leaves [illegible] Stem 5 feet high, dark purple, [illegible] Flowers from 4 up to 30 or 40 in a good specimen, all nodding. Perianth 4 inches long, the segments [illegible] with purple spots, and a green triangular mark at the base of the three outer segments. Berry [illegible] much as in *L. canadense*, but larger.

THE Swamp Lily is found commonly in most of the Eastern States of North America, from Canada to Carolina, growing in wet and swampy ground which is sometimes under water all the winter. Mr. Hanson tells me that he once found a spot in New Jersey where there were at least 5000 plants of this noble Lily all in flower at once, ranging up to 6 feet high, and bearing as many as 30 flowers, but out of the whole number it was difficult to find three exactly alike. The western range of this plant is not well known, and towards the Southern States it merges into a distinct form or species known as *L. carolinianum*, Michx., of which I shall give a figure separately. According to Prof. Asa Gray, the Swamp Lily also approaches *L. canadense* very closely in some of its forms, but, as far as I have seen, they may always be distinguished by the green triangular marks at the base of the inner perianth-segments and generally by the purple colour of the stem.

L. superbum, in suitable soil, attains a great height and beauty, but is rarely seen in perfection in England. It likes a deep, wet, peaty situation, and will hardly exist on dry or calcareous soils. It may be seen to great advantage in the nurseries of Mr. A. Waterer, at Knaphill, at Mr. P. Barr's grounds, and elsewhere.

It has been introduced into this country for at least a century, perhaps longer, and is now tolerably common. Its bulbs are impatient of removal, and should never be disturbed when the plant is in a thriving state. It produces seed freely, but this does not germinate for a year or more after sowing, and is very troublesome to raise. Though in size, number, and colour of flowers the plant is very variable, I have seen no varieties worth naming, what is known as *L. superbum pyramidale* being simply a tall and [illegible] form of the plant when well established in deep moist soil.

My figure was taken from a plant which flowered at Mr. Wilson's towards the end of July 1875, and, though not showing the green star at the base of the flower as plainly as I should wish, [illegible] representation of it.

Lilium Leichtlinii

LILIUM LEICHTLINI.

LEICHTLIN'S LILY

L. Leichtlini, Hook. fil., Bot. Mag. t. 5679, Ill. Hort. t. 510, Flore des Serres, t. 1736 & 2191-92, Belg. Hort. 1869, p. 1, Floral Mag. t. 509.

Bulbus parvus, perennis, globosus, squamis paucis latis acutis albis laxis apice subincrassatis. Caulis 2-pedalis et ultra, strictus, glaber, saturate purpureo-brunneus, apice obscure puberulus, basi repens. Folia 30–40, sparsa, linearia, ascendentia, saturate viridia, firma, plana, distincte 3-nervia, inferiora 3–5 poll. longa, 3–4 lin. lata, suprema lanceolata. Flores 1–5, axe corymbosi, pedicellis erecto-patentibus, 3–4 poll. longis, apice cernuis. Perianthium amplum, 3½ poll. longum, splendide cinnabarinum, extus purpureo-maculatum, in alis interioribus saturatius, basi usque sulcis obscure purpureo-punctatis, segmentis oblanceolatis, apice 8–12 lin. latis, profunde recurvis, apice crassis, minute papillosis, margine leviter undulatis, fovea exserta non marginata, basi obscure puberulis, ovarium superantibus. Filamenta flava, apice rubra, basi purpureo-maculata, 6 poll. longa. Ovarium gracile, 9 lin. longum, stylo 1 poll. longo, 3-sulcato, stigmate subcapitato.

Var. *maculatum*, Anglesea in Journ. Hort. 1870, 371, cum floribus majoribus, extus maculatis, interioribus basi dense purpureo-punctatis.

Hab. Japonia, Maximowicz.

Bulb small, white, with a few thick broad scales. Stem 2–4 feet high, not ascending directly from the bulb, but creeping underground horizontally to some distance from it, and bearing small bulbs at intervals upon its subterraneous portion. Leaves scattered, 30–40 in number, 3–6 inches long, 3–4 lines broad, acutely pointed, and gradually narrowed to the base, obscurely 3-nerved, obscurely puberulous beneath. Flowers 1–3 or sometimes more, pedicels 3–4 inches long. Perianth 2½–3 inches deep, bright yellow, the divisions much reflexed, lanceolate, ½–1 inch broad, spotted copiously with purple-red, the base broad, with the groove edged with hairy lines. Ovary ¾ inch long, style 2 inches, filaments 2¼–3 inches, anthers 2 lines, pollen reddish. Capsule unknown to me, but said by Professor Maximowicz to be oblong and flat, the apex with 6 projections.

THE handsome Lily which bears the name of one who has perhaps done more for this genus in a horticultural sense than any other person, HERR MAX LEICHTLIN, of Baden, was first brought to notice by its accidental appearance amongst a bed of *Lilium auratum* in MESSRS. VEITCH'S Nursery in 1867. Since then it has been imported sparingly from Japan, and has been cultivated with indifferent success in Europe, though as Mr. WILSON has shown, there is no reason why the plant should not be grown and propagated with as much ease as many other species. The creeping habit which is characteristic of this Lily must always be taken into consideration, as if planted in a small pot, the shoot is apt to get broken or checked in its growth, and as it is never very robust, in many cases death ensues. If planted in the open ground, care should be taken that it has plenty of light and is protected from the hot sun, as this Lily is easily scorched up and injured by drought in summer.

Very little is known of the plant in its native country, but I am indebted to PROFESSOR MAXIMOWICZ for the following information:—"I had this Lily first from the gardens of Yedo, in 1862, blossoming at the end of July and in August, under the name of 'Hirado Yuri,' i.e. Lily from Hirado island, but the native botanists call a plant which seems to be a variety of *L. elegans* by the same name. In the middle of November I got the ripe fruit from the woods at the foot of Fuji yama. From here it is said to extend throughout the Idsu peninsula to the neighbourhood of Yokohama, but nowhere very common. It bears 1–7 flowers, and differs from *L. Maximowiczii* in the following particulars:

L. Leichtlini	*L. Maximowiczii*
The stem is terete, peduncles longer than flower	The stem is winged and angular, peduncles shorter than the flower
Stem bracteate mostly in the middle	Stem bracteate at the base
[illegible] longer than flower more revolute, stamens [illegible] large flat narrowly subulate, style club-shaped thickened	[illegible]
Capsule [illegible] large [illegible] apex [illegible] projections	Capsule ambonate

As Professor Maximowicz is perhaps the only botanist who has had the advantage of comparing these species in a wild state, great weight must be allowed to his opinion, but I cannot withold the remark that, however different they may appear at first sight, I am not inclined, as far as my experience of them in cultivation goes, to allow much importance to these characters. In fact, if it were not that such good botanists as Dr. Hooker and Mr Baker had treated this plant as a distinct species, I should be inclined to join it with *L. pseudotagetum* and *L. Maximowiczii*. The colour of the flower, however, will always distinguish it from either of these, and does not seem to vary at all.

The form distinguished as *L. Leichtlini majus* is, I believe, in a great measure the result of the superior cultivation for which Mr. Wilson is so distinguished, as I have not seen it except in his garden. I am indebted to him for the plant here figured, which flowered at Heatherbank in July 1875.

Lilium callosum

LILIUM CALLOSUM.

SIEBOLD'S LILY

L. Callosum, Sieb. & Zucc. Fl. Jap. fr. 36, t. 21 Miquel, Ann. Mus. Lug. Bat. iii. 166 Flore des Serres. 2 .

L. pomponium, Thunb. Fl. Jap. 194, non Linn

Fine-Juri, Kæmpfer, Amœn. v 871

Bulbus parvus perennis squamis paucis lanceolatis. Caulis 2-3-pedalis gracilis teres glaber Folia 20-30 sparsa linearia ascendentia glabra firma viridia 3-5-nervata marginibus anguste revolutis, inferiora 3-4 poll longa, medio 1-2 lin. lata superiora sensim minora. Racemus angustus laxus 2-6-florus pedicellis brevibus cernuis, bracteis gemmas æquantibus ovatis 4-9 lin. longis, apice obtusis callosis. Perianthium coccineum, 15-18 lin. longum, segmentis oblanceolato-spathulatis 3/4 lin. latis, apice cucullatis, fovcola glabra profunde excavata, marginibus glabris. Filamenta perianthio triente breviora antheris coccineis 3-4 lin. longis. Ovarium 8-10 lin longum, stylo clavato sex-ter declinato. Capsula elongata 15-18 lin longa, obtuse angulata.

Hab. Japonia et insulæ Loochoo (Maximowicz, Oldham, Bürger).

Var. STENOPHYLLUM

L. tenuifolium, var *stenophyllum*, Baker, J. L. S. Bot xiv p. 251

L. callosum, Maxim. Fl. Amur

L. pumilum, Regel, Gartenflora. 1865, t. 463 fig. 1, et Hort. Leichtlin. non D.C

Caulis humilior. folia saturatius. bracteis haud vel minus callosis.

Hab Mantchuria (Maximowicz). Dauuria austro-orientalis (Maack).

Bulb globose, an inch thick, with oblong cuspidate white scales. Stem 1½–3 feet high, slender terete, glabrous green, shading to purple at base. Leaves 20–30, scattered, lax, linear, 3–4 inches long, 1–2 lines broad, narrowed gradually to the base acutely pointed, the edges slightly revolute, 3–5-nerved. Flowers 2–9, pedicels arcuate, ascending, 1–3 inches long, subtended (in the Japanese plants, though not so distinctly in the Siberian specimens) by a pair of bracts, callous at the tip. Perianth minium-red, with obscure black dots on lower half, 1¼–1½ inch long, the segments oblanceolate-spathulate 3–4 lines broad, obscurely papillose, recurved from about half their length. Ovary clavate, 1 inch long, style ⅝ inch long. Filaments about an inch; anthers versatile, 3–4 lines long, pollen scarlet. Capsule 1¼–1½ inch long, narrow in proportion to its length

THE plant here described is one which, until quite recently, was little known in Europe, and as it has been confused by authors with another species (*L. tenuifolium*), I have taken an early opportunity of figuring it.

Originally described and figured in Siebold's fine folio work on the Flora of Japan, it was afterwards discovered by Professor Maximowicz in Amurland and Mantchuria, and introduced by Maack to the Botanic Garden of St. Petersburg in 1859. The continental variety which he sent, being in some points unlike the Japanese plant figured by Siebold, was supposed by Dr. Regel to be the *Lilium pumilum* of Redouté, and was figured by him under that name in the 'Gartenflora' for 1865.

This variety was afterwards described by Mr. Baker in the 'Journal of the Linnean Society,' from a drawing of Mr. Leichtlin's, as a variety of *L. tenuifolium*. On a subsequent examination of the plant in a living state, and comparison with dried specimens from Japan, however, Mr. Baker agreed with me that it is really not distinct from Siebold's species, though the callous bracts, which in his figure are probably somewhat exaggerated, are hardly visible in many specimens.

Professor Maximowicz of St. Petersburg, to whom I applied for information, confirms this opinion and tells me that this variety, which he calls *pumilum*, is smaller and lower than the Japanese variety, has fewer flowers, broader leaves, and less conspicuous bracts. He found it rare in Mantchuria, in the low flats along the

Sungari river, but more common on drier meadows further up the same river, where it flowers in the month of July. The Japanese plant he found abundantly round Nagasaki, at 500–2000 feet elevation, in mountain-pastures, where it flowers from July to the end of September—also in grassy valleys at the foot of volcanic mountains in Simabara, he did not find it, however, in the island of Nippon.

Siebold tells us that he found it growing, in company with such plants as *Smilacina*, *Lespedeza*, *Veronica*, and various grasses, on the slopes of volcanic mountains. He also states that the bulbs are collected and eaten like those of *L. tigrinum*, either boiled or roasted. They are very nourishing and agreeable in taste, and are used in a preserved state as a remedy for chronic coughs.

As an ornamental plant this species has little to recommend it. Its flowers are small and dull in colour compared with most Lilies, and though it is quite hardy and easy of culture, it is not likely to find favour in the majority of gardens. The specimen figured flowered in my garden in July 1876, from a bulb sent me by Dr. Regel in the previous autumn. It produces seed in good seasons; but, being now tolerably abundant in cultivation, I have not attempted to raise it. I believe that most of the plants now in England are of Russian origin, and belong to the Siberian variety, as I have seen none which showed the callous bracts as distinctly as they are shown in dried specimens from Japan.

Lilium parvum

LILIUM PARVUM.

IE SMALL FLOWERED ROCKY MOUNTAIN LILY

L. parvum, Kellogg, Proc Cal. Acad. ii. 179, t. 62 Regel, Gartenflora, t. 725 Duchartre, Obs. 08

L. canadense, var *parvum*. Baker Linn. Journ xiv p. 241 Bot. Mag. t. 6 1 o

Bulbus breviter rhizomatosus, squamis laxis articulatis albidis. Caulis 2–5-pedalis, teres, viridis, glaber, infra racemi medium foliis verticillatim vel sparse, 2–3 poll. longa, 4–6 lin. lata. Racemus laxus 2–30-florus, pedicellis ascendentibus 3–6 poll. longis bracteolatis. Flores horizontales vel suberecti. Perianthium 15–18 lin. longum, aurantiacum, sepalisque punctatis . . . entis acutis, 3–6 lin. latis, supra medium falcatis. Ovarium 3–4 lin. longum, styli suberecti dimidia longitudine Capsula . . . ncea 4–6 lin. longa 3–4 lata, oblonge angulata

Hab. California, ad montes Sierra Nevada, alt. 4000–8000 pedes Kellogg, Bolander Roezl

Bulb small for the size of the plant, shortly rhizomatous, and composed of many loosely attached, small, white, jointed scales. Stem . . . h, usually naked below the raceme. Leaves scattered, or in whorls of 8–10, lanceolate, 2–3 inches . . . 4–6 . . . Flowers . . . 30 or sometimes 40 or more as 50 in number disposed in a loose raceme on ascending pedicels, 3–5 inches long, inclined upwards or horizontal, but never drooping. Perianth 15–18 lines long, pale or dark . . . the segments with . . . of purple . . . Stamens (nearly as long as the . . . Capsule short, oblong, smaller than in any of the allied species

THE name of *parvum*, though applicable to the flowers of this plant, which are small in comparison with those of its nearest allies, is certainly not descriptive of the species, for though not usually seen in a thriving condition in Europe, it is said to attain in its native mountains a height of 5 feet, or even more. It was only known to the scientific world since 1868, when Dr. Kellogg, of San Francisco, described it and though not recognized as a distinct species by Mr. Baker, I think I can clearly show that, though a variable plant it never approaches any of the forms of *L. canadense*, and may also be distinguished from any other by its bulb, capsule, and the form and position of its flowers, which are always more erect than

It is a native of the higher parts of the Sierra Nevada and other ranges in the Pacific States of North America, where it is found at an elevation of 4000–8000 feet. It is said by Dr Bolander to grow exclusively on the banks of mountain-streams, or in shady swampy places through which a constant stream of cold wat

It was first introduced by Mr. B. Roezl, who sent it to Herr Leichtlin in 1872, and was figured in the 'Gartenflora' in 1873, though, owing to the weak condition of the plant, that plate does not give a . . . from characters

There are many varieties of colour, some without spots, and some much deeper than the plant figured but I have never seen any departure from the characteristic form and position of the flower Five of these varieties are named by Mr. J H Krelage, of Haarlem, in his 'Catalogue of Lilies' for 1876.

The bulbs of this Lily sometimes grow in large masses which produce a number of stems and ramify in every direction, the scales are usually articulated in three or four places, and are very fragile. On this account it is best to leave it undisturbed as long as possible, until, either from the exhaustion of the soil or from the overcrowding of the stems, it becomes necessary to divide it

It appears to succeed best in moist peaty soil, and if undisturbed soon acquires vigour, though I have nowhere seen a finer example than the one here figured, for which I am indebted to Messrs Barr and Sugden . . . grow . . . flowers annually . . .

LILIUM NEILGHERRIENSE.

THE NEILGHERRY LILY

L. neilgherrense Wight Ic t. 2031 2 Baker J Jo u x c p

L. tubiflorum Wight Ic t. 2033 4

L. Wallichianum Wight Ic t. 2035, non Schu ces fil

L. Martinii Steud. in Hohen Pl Or Exsic no. 954

L. neilgherrense hort. Veitch Lemaire Ill Hort x. t. 35

Bulbus globosus, 1–3-polycarpus albidus, squamis crassis, lanceolatis. Caulis 2–3-pedalis, strictus, glaber, basi sub terra longe squamosus Folia 30–40, glabra, utrinque viridia, ascendentia, sparsa, distincte 3–5-nervata, inferiora 3–4 poll longa, mediana 5 lata Flores 1 3 vel plures, non vel lutes suaveolentes, horizontales. Perianthium anguste infundibuliforme pollicipitum be 2–5 poll supra basin vix amplince, segmentis oblanceolato-unguiculatis flore expanso apice solum falcatis crispulatis n, ov carnosis, 10–20 lin. latis. Staminia perianthio paulo breviora, antheris anguste, 2–12 lin longis, po te da Ovarium va o longum, ac ol stylo gra e o roseum stigmatibus æquilongum Capsula obl ungu obtuse angulosa

Hab. Ad montes Insiæ peninsularis, 5000–8000 ped. alt (Wight Lobb Morgan).

Bulb roundish, composed of firm, thick, compact whitish or purpl sh scales. Stem usually creeping at the base, sometimes to distance of 1–2 feet, bearing many bulbils on its subterraneous portion, 2–3 feet high, stout, glabrous, green, or tinged purple Leaves 30–40, lanceolate, erecto-patent, the lower ones 3–5 inches long, 8–12 lines broad, the upper ones becoming much shorter but not narrower, 3–7-nerved. Flowers 1–3, or more, drooping in the bud, horizontal when expanded, white or semetimes occasionally pink-tinged. Perianth 6–12 inches in length, with the tube narrow for nearly half its length and the mouth widely expanded and slightly recurved. Segments broad, distinctly keeled, and callous at the tip. Stamens shorter than the style the ers narrow, pollen yellow. Capsule 1½–2 inches long, umbilicate at top and bot

TWO years ago I should hardly have ventured to publish the plate here given, lest I should be said to have exaggerated the size and beauty of this flower, but I am now confident that, so far from exceeding in these respects the limits of truth, I have, if any thing, fallen short of them.

Lilium neilgherrense has larger flowers than any plant belonging to the Order Liliaceæ with which I am acquainted, as, in dried specimens which I have examined, they exceed a foot in length, and, though not so attractive in colour as in some other kinds, are most elegant in form and deliciously scented.

The late Dr. Wight, whose great illustrated work on the plants of Southern India will always remain as a monument to his labours, first discovered this plant in the Neilgherry Hills, to which, with a few other mountain-tracts of moderate area in Southern India, it is restricted. Though nearly allied to Wallich's Lily, which represents it in the Himalayas, and varying considerably in itself, the Neilgherry Lily may be looked upon as a distinct and fairly well-marked species—always to be recognized by its long-tubed open-mouthed flower, its creeping stem, and short leaves.

Though found in hilly parts of the Mysore territory, north of the Neilgherries, this Lily is not known with certainty to exist in the Annamally and Cardamom Hills to the southward; but when travelling through these little-known regions in March 1870, I found what I believe were the withered stems of this plant, and judging from the resemblance of the flora of these mountains to that of the Neilgherries, I have little doubt it will be found in them wherever suitable localities exist.

Mr. R. Morgan tells me that *L. neilgherrense* is generally found growing in rocky and precipitous places, and also amongst low *Acanthus* bushes on hill-sides. It luxuriates in the black loamy soil found in the chinks and crevices of large rocks, and thrives in a comparatively warm climate, such as that of Coonoor at about 6000 feet elevation—though also found up to 8000 feet, on the Snowdon and Dodabetta peaks. It flowers in September or October, and ripens its seed in January or February.

* According to the most correct system of spelling Indian names, this should be written Neilgherry; but as the name has been spelt by Wight and Bentham in their well-known Flora, and by most other botanists, I think it best to retain the spelling of it.

which proves to be a much better constitution and to be more easy to cultivate than many of its congeners

Though it may pass by that name and flower out of doors in the south west of England, and perhaps elsewhere I should not recommend any one to treat it as a hardy plant—not only on account of its dislike to cold but still more because of the very late period at which it commences growth

Except *L. Wallichianum*, I know of no other Lily which is so late both in coming up and in flowering, and this has another peculiarity which must be well remembered by those who wish to succeed in its culture—namely the eccentric habit which is shown by the young shoot to run for some distance in a horizontal direction before entering the soil. This habit, though not invariable, is usual, and causes the loss or injury of many bulbs when grown in pots, if care is not taken to watch the first appearance of the shoot and direct it upwards, filling up the pot to the requisite level after it is well above ground; otherwise the shoots will descend against the side of the pot and after making a turn round at the bottom and wasting their strength among the crocks, come up through the drainage hole, or perhaps appear at last on the surface too late in the season and too exhausted to flower

If care be taken not to overwater it, and to keep down aphides, I believe this Lily will succeed to perfection planted out in a Camellia-house, where it will have plenty of space to travel about at will.

Though I have not yet seen more than three flowers on a single stem, I believe it is capable of producing far more; and as not only is easier than to have plants flowering in succession from July to November it must be considered equal, if not superior to *L. auratum* as an indoor Lily, and surpassing all others, except *L. speciosum*, which I still look on as the best of the genus

Though the flowers vary in size from 6 inches up to a foot long, and in colour from creamy white to lemon yellow and occasionally pink, the varieties are not, in a botanical point of view, very remarkable, and until I know more about their constancy and local distribution, I should be disinclined to separate any of them from the type, though Wallich, relying on characters which in this genus are of little value, described them as three species

The seeds, which seem to take much longer in ripening than in the case with Lilies from higher latitudes, germinate quickly, like those of *L. longiflorum*, and produce leaflets at once, after the manner of *L. candidum*. I imagine that in four or five years the seedlings will attain a flowering size; but as offsets are made freely, both on the bulb and on the subterranean stem, it is easy to increase the plant without so great an exercise of patience

The plant here figured flowered in the garden of J. H. Lawes, Esq., at Colesborne Park, Gloucestershire, in July 1876, and is the same from which a drawing was made by Mr. Fitch for the 'Gardeners' Chronicle'

LILIUM PARDALINUM.

THE CALIFORNIAN LILY

L. pardalinum, Kell., Proc. Cal. Acad. ii. 12, Duchartre, Obs. 37. Baker, Linn. Journ. xiv. p. [illegible]

L. pardalinum, var. *paludifolium*, Baker, *loc. cit.*

L. pardalinum, var. *Bourgæi*, Baker, *loc. cit.*

L. pardalinum, var. *californicum*, herb. Lindley, Florist, 1873, p. 318, t. 33.

† *L. Roezlii*, Regel, Gartenflora, t. 507, 1872.

L. canadense, var. *Hartwegi*, Baker, Gard. Chron. 1871, p. 329.

L. canadense, var. *Walkeri*, Wood, Proc. Acad. Phil. 1868, p. 160.

† *L. canadense*, var. *puberulum*, Torr. Bot. Whipple, 90.

Bulbus magnus, breviter stoloniferus, squamis lanceolatis plurimis, semisime articulatis. Caulis 3–6-podalis, teres, viridis, glaber. Folia in verticillos 6–12-fonatos disposita vel sparsa, 3–6 poll. longa, 9–18 lin. lata, glauca, tenera, 3–7-venata. Flores 3–30 in racemum disposit; pedicellis elongatis apice cernuis. Perianthium 2–3 poll. longum, splendide rubrum, fundo aurantiaco, purpureo-punctatum, segmentis a basi cum 3 paullo infra medium expansis, fovea excavata, marginibus glabris. Stamina perianthio tricnta breviora, antheris fulvis, stylus ovarium duplo superans, 12–18 lin. longus. Capsula oblonga apice umbilicata.

Hab. California, Oregon, Utah. (Hartweg, Roezl, Kellogg, &c.).

Bulb large, white, producing 1–6 stolons or new bulbs annually, composed of thick, white, often articulated scales. Stem 3–4 feet high, stout, glaborous, green. Leaves 4–7 inches long, 1–2 broad, oblong-lanceolate, generally in regular whorls of 6 or more, but on young plants often scattered, veins from 1 to 3, more or less indistinct. Flowers 3–30, arranged on long pedicels in an open racemc. Perianth 2–3 inches long, red or crimson, with the lower part of the segments orange, spotted with purple, much reflexed. Filaments a third shorter than the segments; style curved, twice as long as the ovary. Capsule an inch long, umbonate at the apex.

THE fine Lily, of which one variety is here figured, has been known for some years, having been collected by Hartweg in 1848, and received the MS. name of *californicum* from Dr. Lindley. As, however, no description was published until 1859, and a plant which had been previously named by Torrey cannot certainly be referred to this species, it will be best to keep it under Dr. Kellogg's name, by which it is most generally known both in America and England.

The varieties of this species are both numerous and puzzling, but after watching the growth of many plants from different sources, in my own garden and those of others, for four seasons, I am inclined to believe that not more than two or three are worthy of description, and that even these might so change their form if removed to a different soil and climate, that it would be hard to recognize or distinguish them. Botanists when naming species from dried specimens, or after the comparison of a few plants, are often misled by characters which seem at the time good and distinct, but which prove too unstable to rely on, so that the confusion which prevailed among the various western species of American Lilies would hardly have been cleared up if it had not been for the assistance that has been derived from horticulture.

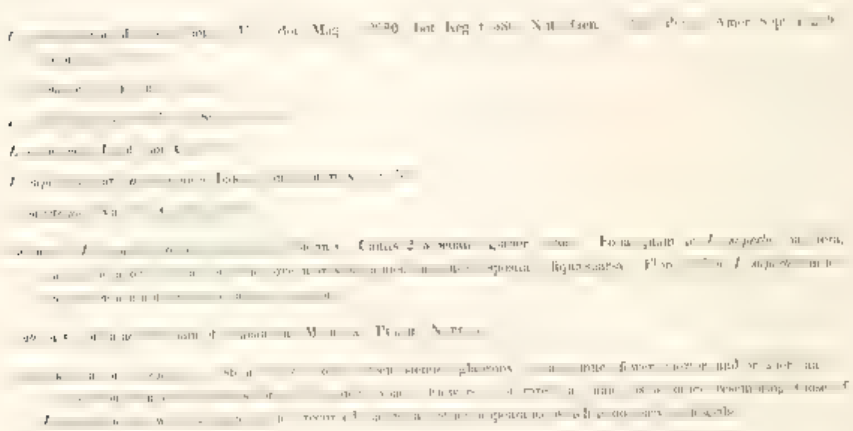
I cannot certainly say whether the plants named *Bourgæi*, *Roezlii*, and *Walkeri* come properly under this species or not, but no living plant out of the thousands I have examined can be referred to either *L. canadense* or *L. superbum*, and though these species, or varieties of them, may extend west of the Rocky Mountains, yet I am inclined to think that all the Lilies with stoloniferous bulbs from the Pacific States are forms of *L. pardalinum*.

As I shall have to give another Plate of this species, I will leave the description of the different varieties for a future article, merely stating that the one figured here, which, I believe, should stand as var. *californicum*, may always be distinguished from the rest by the greater size and beauty, though smaller number of its flowers, which rarely exceed three in number. I was informed by Herr Roezl that it is found on the coast range, at a lower elevation than the other varieties, and that in the interior it is represented by a taller and many-flowered plant which he named *L. puberulum*.

Lilium Catesbæi

LILIUM CAROLINIANUM

THE SOUTHERN SWAMP LILY



LILIUM CATESBÆI.

ESSENTIAL

Catesb. Wate. Fl. Carol. p. 6. *Bot. Mag.* 259. *Engl. Bot.* t. 807. *Sweet. Brit. Flow. Gard.* ser. [illegible] p. 17. *Ker. Fl. Amer. Sept.* p. 15. *Bot. Reg.* 6. *Lam. Encyclop.* p.

Lilium speciosum. Thunb. Sieb. et Zucc. Fl. Jap. 1. p. 93. non Martagon.

Lilium. Bulbus squamis ovatis acuminatis imbricatis. Caulis [illegible] foliatus. Folia [illegible] verticillata. Flores [illegible] racemosi. Perianthium [illegible] patens. Stamina [illegible] declinata. Stylus [illegible] declinatus. Stigma [illegible] trifidum. Capsula [illegible] trigona, trilocularis, polysperma. Semina [illegible] plana, membranacea.

Obs. A Cyrtomio [illegible] Lonicerianum Mississippo [illegible] Martagone [illegible] Pomponio [illegible]

Bulb [illegible] scales [illegible] terminating [illegible] flowers. Stem 1–2 feet high, [illegible] smooth, [illegible] smaller upwards. [illegible] single point [illegible] right [illegible] longer than stamens, which [illegible] Capsule [illegible]

IT HAS been the very common fate of the [illegible] of the same parts of the [illegible] found here.

This gay and [illegible] plant [illegible] and meadows [illegible] of the eastern States, from Carolina to Louisiana and [illegible] and [illegible] and [illegible] and bigness [illegible] and as most distinct [illegible] of *L. superbum* [illegible] station. What has been [illegible] states a variety of *L. dauricum* [illegible]

The structure of the [illegible] of *L. superbum* as figured [illegible] and grew through [illegible]

As the leaves decay [illegible] stem [illegible] stored [illegible] turns [illegible]

[illegible] very [illegible] [illegible] [illegible]

LILIUM LONGIFLORUM.

THE LONG-FLOWERED LILY

L. Longiflorum, Thunb. Linn. Trans. ii. p. 333; Spae, Mon. p. 13; Bot. Reg. t. 560; Flore des Serres, t. 270; Lodd. Bot. Cab. t. 985; Miquel, Ann. Mus. Lug. Bat. iii. 107; Baker, Linn. Journ. xiv. p. 219.

Bulbus perennis flavescens squamis lanceolatis. Caulis 1 3-pedalis strictus glaber. Folia 20–40 sparsa ascendentia nitide viridia glabra, 3–5-nervata, 3–5 poll. longa, 4–6 lin. lata. Flores subhorizontales, sæpissime solitarii, interdum 2–7. Perianthium album suaveolens anguste infundibuliforme 6–8½ poll. longum, tubo 2–3 poll. supra basin, vix ampliato, segmentis oblanceolatis obtusis flore expanso quadrante superiore fulcris ad basin tertiis superioris 12–18 lin. latis, interioribus latioribus. Filamenta alba 4–6 poll. longa; antheræ flavæ 6–9 lin. longæ, polline luteo. Ovarium 1 x ¼ poll. longum, cum stylo semper declinato staminibus vix superans. Capsula 1½–2 poll. longa, obtuse 6-angulata.

Hab. Japonia. China. Formosa. Insulæ Loochoo.

Var. EXIMIUM. Court. Spae, Mon. p. 14. Flore des Serres, t. 283–4 (*L. Japonicum*, Siebold & De Vriese, Tuinbow Flora, v. 319 !); est forma major floribus longioribus.

Var. TAKESIMA of Leichtlin. Huic est forma caule et floribus ad basin extus purpureo-tinctis.

Stem moderate, yellowish, usually flattened above, producing small bulbils freely at the upper part and base of the stem. Stem 6–8 feet high, smooth, glaucous. Leaves 20–40, scattered, bright green, 3–5 inches long, 4–6 lines wide. Flowers horizontal, usually solitary, but often 2–6 or 7, pure white, very sweet-scented. Perianth 6–8¼ inches long, tubular for half its length, opening at the mouth but not reflexed. Filaments white, 4–7 inches long; pollen yellow. Ovary and style equalling them in length, slightly declined. Capsule 1½–2 inches long, faintly angled.

THE Long-flowered White Lily is a native of many parts of the coasts and islands of China, being found also in Japan, Loochoo, and Cochinchina, though perhaps not everywhere indigenous. It is also found, as I am informed by MR. SWINHOE, on the island of Formosa, but this plant, of which I have not as yet succeeded in getting living specimens, may be a distinct species, approaching in its very narrow leaves and the length of its flowers the Philippine Lily.

L. longiflorum is much cultivated in China, Japan, and India, and seems to endure a greater degree of heat than any other species, but is at the same time perfectly hardy in this country. Introduced as long ago as 1819 by the Royal Horticultural Society, it soon became common in Europe, and may now be had by the thousand at a very low price.

No lily can be more strongly recommended for greenhouse decoration than this, for, though in some parts of England it may be grown well out of doors, it is apt to be injured by spring frosts, and rarely comes to perfection unless grown under glass.

The plant I have represented is the variety named *L. eximium* by COURTOIS, and is as much rarer than the ordinary *L. longiflorum* as it is superior to it. Though rarely seen in this state of perfection, I have had it even finer, with no less than twenty flowers on three stems in a 7-inch pot.

For this fine variety I have to thank LADY RAMSAY of Cheltenham, who received it from Japan some years ago, and has cultivated it with extraordinary success, as will be admitted by any one who has at the Cheltenham flower-shows seen her specimen plants with ten or twelve stems bearing from three to six flowers each.

The variety called *Takesima* is distinguished by a purplish tint on the stem and outside of the tube, and another variety, named *Wilsoni* by MR. LEICHTLIN, is also remarkable for the size and number of its flowers.

M. DECAISNE, in his 'Observations sur le genre Lis,' p. 37, thinks that the varieties *eximium* and *Takesima* may be distinguished by the angle formed by the flower with the stem, as well as by the relative size, but I have been unable to verify his observations in this respect by my own experience.

In the Arb. I was [illegible] these were [illegible] and [illegible] gathered at Kinkiang, which appear to be a somewhat [illegible] passion between *I. longiflorum* and *I. Brownii*, with more open flowers than the former and [illegible] apparently [illegible] Dr. [illegible] of Shanghai, however, is about to [illegible] with [illegible] and [illegible] whether [illegible] perfectly a variety [illegible]

From Mr. Parkes of Yokohama I have received a variety said to be from Japan which is said to have yellow flowers, and in the Japanese [illegible] a coloured plate is represented of it. I have not as yet had the [illegible] from the [illegible] at home or any European garden.

A form with white margins [illegible] is occasionally introduced from Japan, where [illegible] variegation in the foliage of plants [illegible] than in Europe. Mr. Hogg tells me that he has never seen *I. longiflorum* [illegible] though it is common in gardens and known by the name of "Tenpo-Yuri," or Gun Li from its [illegible] flowers.

The seeds of this species, though seldom ripened in England, are much more rapid in their growth than is the case with most kinds. I believe that, in three or four years at most, [illegible] will be produced [illegible] are [illegible] by the end

LILIUM BULBIFERUM.

THE BULBIFEROUS LILY

L. bulbiferum, L., Park. Fætad. 37, t. 2, Jacq. Fl. Austr. t. 226, Bot. Mag. t. 1018, Red. Lil. t. 21 [illegible] t. 231, Baker, Linn. Journ. xiv. p. [illegible]

L. [illegible] [illegible]

[illegible] Miller, Dict. no. 4

L. pubescens, Bernh. Kunth, Enum. iv. 21

Bulbus ovoideus, nitidus, perennis, squamis crassis acutis. Caulis 2–4-pedalis, strictus, sulcatus, purpureo maculatus, supra [illegible] Folia [illegible] in *L. croceo* paucioria [illegible] 1 poll. longa, medio [illegible] lata, [illegible] rectis copiose bulbifera. Flores 1–12, umbellati vel deflexo-racemosi. Pedicelli erecti, breves, purpureo maculati, pubescentes. Perianthium 3–2½ poll. longum, erectum, modorum, splendide rubrum, sæpe fundo aurantiaco tinctum, segmentis oblongo-spathulatis, medio 9–15 lin. latis, anterioribus minus unguiculatis quam in *L. croceo*, omnibus facie nigro [illegible] versum alde lamellatis et papillosis, sinu semiorbiculari profunde excavato, marginibus pilosis. Filamenta 18–21 lin. longa, inferioris 3–4 lin. longis, nitidine rubro. Ovarium 7–8 lin. longum, stylo simplici brevius. Capsula 1½ poll. longa, oblonga [illegible] triangulari, lobis [illegible]

Hab. Grisons. Tyrol. Styria. Bavaria. East Gothland(?).

Bulb white, composed of thick broad scales. Stem 2–4 feet high, rigid, conspicuously furrowed, and spotted with purple [illegible] ture, prominently 5–7-nerved, bearing, in the axils towards the upper part of the stem, single or clustered purplish-green bulb [illegible] on the wild plant, but in cultivation more numerous, forming an umbel or crowded raceme. Pedicel [illegible] Perianth [illegible] inches deep, bright [illegible] Filaments and style erect, pollen red. Capsule said to be bluntly angled and deeply umbilicate at the apex.

THE bulbiferous Lily, though well known both to botanists and gardeners, is a plant of rather limited range in the mountains of Central Europe, and is found, as far as I can discover, only in the [illegible] of Switzerland, the Tyrol, and the lower Alps of Styria, Carinthia, Venetia, and Bavaria. From Mr. G. Maw of Benthall, I learn that the only localities where he has found it growing are Vols, in the Tyrol, and the Val di Ledro, at the head of the Lago di Garda, where a very dark blood-red variety, rarely bulbiferous and nearly glabrous, is found.

Mr. G. C. Churchill, whose knowledge of the flora of Central Europe is unsurpassed, tells me he believes [illegible] on Western Switzerland and the Maritime Alps, given by authors for this plant, really refer [illegible] variety *Chaixi*. Gaudin (in his 'Flora of Switzerland,' 2nd edition, 1874), who is, I believe, [illegible] in [illegible] authors, gives only three localities for *L. bulbiferum*—Tarasp, Lu and Fuldera, all of which are in the Grisons, while *L. croceum* is said to be found in the cantons of Uri, Ticino, Valais, Neuchatel, and St. Ga[illegible] The former plant ranges from about 1000 to 4000 feet elevation, and is usually found on the [illegible] woods, [illegible] and bushes. Its supposed occurrence in a wild state in East Gothland, as I think [illegible]

In cultivation this Lily has been known for centuries, being well described and figured in Parkinson's Paradisus, and, though much more robust and larger than the wild plant, preserves the bulbiferous habit, brilliant colour, and peculiar aspect by which it is distinguished from its nearest allies. In a state of nature the bulb-[illegible] and [illegible] [illegible] after the manner of *L. dauricum*, but are confined to the surface, but in cultivation this habit is soon lost. I have never been able to examine a perfect capsule of the plant, which is said to be different in form from those of *L. croceum* and *L. dauricum*; but I think it possible that [illegible] imperfect capsule, such as is sometimes produced if the buds are picked off, may have given rise to this statement.

The varieties of *L. bulbiferum* are not numerous, and the parentage of some that are supposed to spring from it is doubtful.

The Lily known as *L. umbellatum*, which is the most floriferous of all this section (bearing as many as [illegible] fifty blooms), has no bulbils, but flowers at the same time as *L. bulbiferum*, fifteen to twenty days before *L.* [illegible]

There is a curious little stunted plant, which I take to be *L. humile* of Miller, occasionally seen in gardens that resembles *L. bulbiferum* in its principal characters, though much smaller and, as far as my experience goes, never in flower. Except as a curiosity it is not worth cultivation.

L. pubescens, of Bernhard, is another plant sometimes seen on the Continent, and apparently a variety of *L. bulbiferum*, from which it differs by being more pubescent. What is known as *L. umbelliferum incomparabile* is, in fact, one of the finest of Garden Lilies, and a most desirable plant. It is, perhaps, a hybrid between *L. bulbiferum* and *L. elegans* and will be figured with one of the varieties of the latter species.

The cultivation of *L. bulbiferum* is extremely simple, as it succeeds well in the ordinary soil of the garden, and is rapidly increased by the bulblets, which, if planted in good soil, come to a flowering size in two or three years.

The plant figured flowered in my garden in June 1875, and was selected as showing the typical character of the species better than one with a large number of flowers.

LILIUM HUMBOLDTI.

HUMBOLDT'S LILY

L. Humboldti, Roezl & Leichtl., Duchartre, Obs. 105 (1870); Regel, Gartenflora, t. 724; Flore des Serres, t. 1734; Baker, Lond. Journ. xxv. p. 31.

L. Bloomerianum, Kell. Proc. Calif. Acad. vol. iv. pt. 4, p. 166; Feb. 2, 1871.

L. canadense, var. *Humboldti*, Baker, Gard. Chron. 1874.

Bulbus magnus, 2–4 poll. crassus, horizontaliter elongatus, lateri superiori axeos insidens, e squamis distichis ampis latis crassis 2–3 poll. longis, obtuse acuminatis conflatus. Caulis teres, robustus, 4–8-pedalis, glaber vel puberulus, viridis rubello-maculatus. Folia sejunctim regulariter verticillata, in verticillos 4–6-, 10–15-foliatos disposita, oblanceolata, inferiora 4–5 poll. longa, supra medium 9–12 lin. lata, acuta, firma, saturate viridia, nitidula, venis alternantibus distinctis, ad faciem inferiorem magis prominulis. Flores saepe 6–10, interdum 30–40 in paniculum deltoideam expansam pedem latam dispositi, pedicellis suberectis apice cernuis, inferioribus 3–5 poll. longis, floris oblanceolatis value reductis quoad ceteras. Perianthium 4 poll. longum, splendide rubro-aurantiacum, extus basi viridescens, segmentis acutis medio 9–12 lin. latis, supra basin arcte reflexo ad faciem punctis vinoso-purpureis magnis copiosis decoratis, prope basin leviter papilloso-lamellatis, foveola distincte excavata, marginibus glabris. Filamenta 1½–2-pollicaria, antheris rubris 6–8 lin. longis. Stylus 6–7 lin. longus, ovario subtriplo brevior. Capsula obovoidea, more *L. Martagonis* acute 6-angulata.

Hab. California, montibus Sierra Nevada, 2500–3500 pedum altitudine (Roezl et Kellogg).

Var. ocellatum, Kell. Proc. Calif. Acad. v. p. 88, 1873, ex insula Santa Rosa, est forma punctis ocellatis.

Bulb very large, purplish in colour, composed of thick fleshy scales arising from a basal axis, the growth of which is lateral and downwards. Stem produced from the base of the new growth, 4–8 feet high, glabrous or puberulous, spotted or tinged with purplish. Leaves in whorls of 5–12, oblanceolate, 3–5 inches long, 9–12 lines broad, 5-nerved, sometimes ciliate on the nerves beneath and waved at the edges. Flowers 6–30, in an open panicle, pedicels upright or drooping, 3–5 inches long. Perianth 3–4 inches long, orange-yellow with purple spots, sometimes ocellated, and surrounded with an aureola of paler tint. Filaments 1½–2 inches long, anthers 6–8 lines, pollen red. Capsule obovoid, acutely angled like that of *L. Martagon*.

THIS very fine species of Lily was first discovered by Mr. B. Roezl on the centenary of Humboldt's birthday in 1869, in the Sierra-Nevada range in California. He named it *Lilium Humboldti* for his reason, and not, as has been wrongly stated, because it was found in Humboldt County. He sent a quantity of bulbs to Mr. Leichtlin, who, with his usual generosity, distributed them to many of the botanic and private gardens in Europe. He was himself the first in this, as in many other instances, to flower the plant in Europe, and though not so fine as it has been seen since, its beauty was at once recognized by all lovers of Lilies. Large importations were made of this plant in 1872 and 1873, so that it has now become quite common.

Dr. Bolander, in 'The Garden' for Jan. 3, 1874, has given so good an account of its native habitat that I will quote him verbatim:—"This large species has apparently a far less wide range than *L. Washingtonianum*. It occurs mainly on the more elevated portions of the foot hills of the Sierras, from 2500 to nearly 3500 feet altitude, evidently requiring a greater amount of heat to develop its full beauty than the others. The soils in which its bulb is found are of a rather compact character, consisting of clay with an admixture of broken rocks and a small portion of vegetable mould. Growing in open park-land, or land entirely cleared off and therefore exposed to a dry and exsiccating air, we find its bulb also at a considerable depth. The ovoid bulb is very large and strongly built, its outer scales are largest, imbricated, lanceolate, ... whitish purple and very fleshy, well calculated to hold a large supply of moisture. A short time ago this species was also found by Mr. Harford on the Island of Santa Rosa, opposite Santa Barbara. As far as I know it has not yet been found on any part of the coast ranges. The plant from Santa-Rosa Island differs but very slightly from that on the foot hills of the Sierras. Its leaves are of a brighter green, acuminate, and its whorls are denser and more regular, while the leaves of plants from the Sierras are rather spathulate, and ... forms. The former is exposed to sea-breezes and fogs, the latter to a dry air. The bulbs

from Santa Rosa [illegible] far better with us at San Francisco than those from the South [illegible] like The figure in Van Houtte's 'Flore des Serres,' vol. xix. t. 1973, represents a [illegible] form as [illegible] as a representation can be made.

The bulb of *Lilium Humboldti* is very remarkable, not only on account of its great size, but because of its peculiar shape and structure, which has been well described by Prof. Duchartre, in his 'Observations sur le genre Lis,' p. 81. Like that of *L. Washingtonianum*, its scales do not spring from a central base, but from a lateral ascending axis, which, growing outwards and downwards every year, throws up its stems always on one side, and, decaying slowly on the opposite side, forms by degrees an elongated mass, quite different from the bulb of any Old-World Lily. Whether this peculiar structure is in any way influenced by its native soil and climate I cannot say, but it is curious that the only two species which in any way resemble it in bulb characters, viz. *L. Washingtonianum* and *L. columbianum*, are from the Pacific slope of North America.

The colour of the young stem and leaves, like that of the bulb, is purplish, and the growth is very rapid. This species seems to succeed well in England, both out of doors and in pots, and, perhaps owing to its large and solid bulb, suffers much less from importation than the majority of Lilies. It appears to like a peaty soil, and although the [illegible] is sometimes much injured by cold winds or drought, the bulbs rarely decay.

With regard to the varieties of *Lilium Humboldti*, I can say, as I shall have to say of many other Lilies, that if I had only seen a few of the most distinct, I should readily allow that they were worthy of names and descriptions, but having seen and cultivated a large number, I can see no limit by which to define them. For this reason I do not think that the variety named by Kellogg *ocellatum*, from Santa-Rosa Island, can be treated as a distinct plant, though Mr. Roezl thinks that it is more floriferous than the others, producing as many as 30-40 flowers, while the common sort has no more than 20-25 and more usually only 8-15, but see the remarks in Dr. Kellogg's paper.

The size, colour, spots, and arrangement of the flowers vary extremely. In some plants the flowers stand out almost at right angles to the stem; in others, as shown on the Plate, they droop at an angle of 45°; in others the pedicels are inclined upwards; and the size and form of individual flowers also vary considerably.

I have received it from various parts of California, from the Napa valley, and from as far south as Santa Barbara; but Mr. Roezl tells me that the Lily imported as a species from Mexico, and which proved to be a variety of *Humboldti*, is really from San Bias.

For the beautiful specimen here figured, which represents the ocellated variety, I have to thank my friend Mr. Wilson, in whose garden at Heatherbank it flowered in July 1876. The single flowers of other varieties are from my own garden.

Lilium Columbianum

LILIUM COLUMBIANUM.

THE OREGON LILY

L. columbianum, Hanson in hort. Leichtlin., Baker, Linn. Journ. Bot. xiv. p. 242.

L. canadense, var. *parviflorum*, Hook. Fl. Bor.-Am. i. 681.

L. canadense, var. *minus*, Wood, Proc. Acad. Phil. 1868, p. 166.

L. Sayi, Nuttall, MSS.

Bulbus ovoideus, perennans, albus, squamis acutis lanceolatis. Caulis 2–3-pedalis, gracilis, virens, glaber. Folia parca, in verticillos 4–8-natos disposita, superiora sparsa, oblanceolata, acuta, 1½–3 poll. longa, medio 6–9 lin. lata. Flores 2–6, umbellati, pedicellis gracilibus, 2–6 poll. longis, apice cernuis, foliis reductis basi bracteatis, interdum bracteolatis. Perianthium 1½–2 poll. longum, aurantiacum, segmentis lanceolatis, medio 4–6 nn. latis, arcte rollexis, facie crebre purpureo-punctatis, fovea nectarifera leviter excavata. Stamina perianthio breviora, antheris 2–3 lin. longis. Stylus ovarium vix superans. Capsula oblonga, 1 poll. longa.

Hab. Oregon (Lows Rosell). Cascade Mountains. Columbia Britannica (Lyall, Douglas).

Bulb ovoid, perennial, composed of narrow, pointed, compressed scales, which apparently grow on one side only, as in *L. Humboldtii* and *L. Washingtonianum*. Stem 2–3 feet high, green, glabrous. Leaves in whorls of 4–8, or scattered, oblanceolate, acute, 1½–3 inches long, 6–9 lines broad. Flowers 2–6, or more, arranged in an umbel on slender suberect pedicels 2–6 inches long, drooping at the end. Perianth 1½–2 inches long, orange-[illegible] spotted with purple and [illegible] at the base; segments lanceolate, three of the outer rather broader than the inner, all reflexed about the middle down. Stamens a third shorter than the perianth; anthers 2–3 lines long, red with yellow pollen. Style a little longer than the ovary. Capsule [illegible], 1 inch long, obtusely [illegible]

THE Oregon Lily has been for some time in herbaria, and by most botanists considered a variety of *L. canadense*, but there can, I think, be no reasonable doubt that it is quite distinct from that plant, and from any other—not so much on account of its flowers as because of its bulb, which resembles that of no other American species.

It is a native of the coast and interior of the State of Oregon, Washington Territory, and British Columbia, from about 40° to 50° N. latitude, and has been gathered by many explorers of those regions. I learn from Herr B. Roezl that it is found on dry sandy plains, and on the mountains up to 5000–6000 feet elevation, where the climate in winter is very severe, and where rattle-snakes were so abundant in autumn that it was a work of much danger [illegible]

It was first sent to Europe in 1872 or 1873 by Mr. Hanson of New York, who gave it the name of *columbianum*, because it was found on the banks of the Columbia river, and was described by Mr. Baker from a plant which flowered in Herr Max Leichtlin's garden in 1874.

In referring the plant known as *L. canadense parviflorum*, Hook., to this species, I am guided by numerous specimens in the Herbarium at Kew, collected by Lyall and Douglas, the bulbs of which even in a dry state can be distinctly recognized; but no botanist who had not seen the species in a living state could have separated it specifically with any certainty as the whole plant much resembles weak or starved varieties of *L. pardalinum* or *L. canadense*. The bulb, however, is not stoloniferous as in those species, but has more affinity to that of *L. Humboldtii*, of which the plant is perhaps a miniature northern representative.

In this country it proves perfectly hardy, and is easy to cultivate in the same soil and situation as suits *L. pardalinum*. It varies considerably in the size and shape of the leaves (which are usually whorled, but sometimes scattered), and in the form and colour of the flowers, but out of a large number of bulbs which were kindly sent me by Mr. Hanson, not one presented any notable difference from the type, which is well shown in my plate. The plant here figured flowered in July 1875 at Mr. Bull's nurseries in London, but as I was not then quite sure about its [illegible]

The two varieties of which specimens are shown were grown [illegible]

Lilium Speciosum

LILIUM SPECIOSUM.

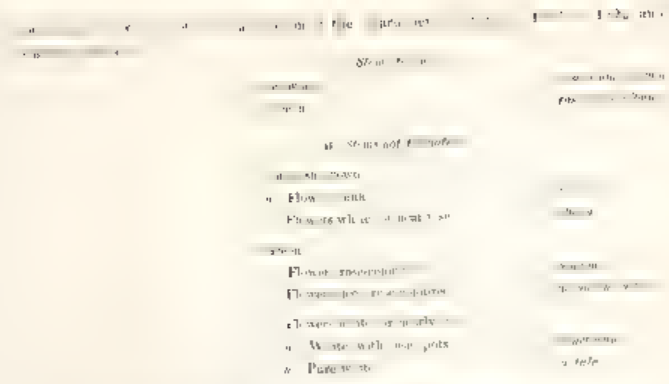
THE LANCE-LEAVED LILY

L. speciosum. Thunberg in Linn. Trans. ii. 332. Bot. Reg. t. 2000. Zucc. in Siebold. Jap. fl. [illegible]. Bot. Mag. 5780. Flore des Serres [illegible]. Baker, Linn. Journ. xv. 1874. p. 2[illegible].

L. superbum, Thunb. Fl. Jap. p. 134 non Linn.

L. tenuifolium, Mussche, Prod. Mag. v. 267 non Hort. et Thunb.

Bulbus perennis, globosus, brunneus vel rubro-brunneus, squamis lanceolatis poticem longis [illegible] rubris. Caulis 4–6 pedalis vel altior, sulcatus, glaber. Folia 2[illegible]-30 sparsa, sessilia, basi saepe petiolata, petiolo ad caulem usque sese, oblongo-lanceolata acuta vel acuminata, nitide viridia, firma, glabra, late rotundata, inferiora 5–8 poll. longa, media 16–18 lin. lata, subtus 7-nervata. Scapus divaricatus, 1–20-florus, pedicellis arcuatis erectis, circa 3 pollicem longis, fibris apice subrectis interdibus apice crassis. Perianthium 3 poll. longum; segmentis oblongo-lanceolatis profunde falcatis [illegible] lin. latis, interioribus [illegible] basi [illegible] rubro-purpureis, [illegible] rubro-purpureis, [illegible] rubro-purpureis,



This arrangement [illegible] is one of the [illegible] now cultivated, as a very good one, and [illegible] to distinguish them without difficulty. As, however, a more detailed description is necessary, I [illegible] separately.

1. *L. speciosum*, proper, Bot. Reg. t. 2000. *f. speciosissimum*, var. *Kæmpferi*, Ft. M. 3785=*atro sanguineum* hort. no. 6 of Dr. Masters's table. This is supposed by Mr. Wilson and others to be the original variety introduced by Von Siebold, and is superior to the majority of those commonly grown. It may be distinguished by the [illegible] marks, as pointed out by Mr. Wilson:—Stature somewhat lower than the average, flower-buds better, segments broader, more perfectly and evenly recurved, having a distinct white margin on a bright rose-pink ground, and very richly coloured spots. Time of flowering rather later than usual. This variety is largely grown at the Knap-Hill Nursery, Woking, where it may be seen in perfection, and thrives in the peaty soil which [illegible] the Rhododendrons for which that nursery is celebrated.

2. *L. speciosum roseum*, Paxt. Mag. v. p. 61, is much like this, but the flowers are not so brightly distinctly [illegible] evenly coloured, or so perfectly formed. It is probably a somewhat deteriorated form.

3. *f. speciosum punctatum*, Paxt. Mag. v. t. 257, *albiflorum*, Bot. Mag. 3785. A lovely variety, pure white [illegible] spotted with delicate rose. This was introduced by Von Siebold at the same time as the first, and is now common.

4. *L. speciosum roseum*. Masters, *loc. cit.* (*L. tamaciomo*, Zucc. et Spae, *L. Brousserii*, Morr. Mém. Acad. Roy. Brux. t. 1834), is a pure white-flowered form with green stem and long much reflexed, wavy petals, no. 8 of Dr. Masters's table. It was also introduced by Von Siebold, and is as much superior to the common white [illegible].

5. *f. speciosum Kræzeri*, Duchartre, Baker, J. L. S. 1874, p. 234, is a white variety, having the backs of the segments strongly tinged with green, but I am doubtful whether it can be separated from the last form.

6. *f. speciosum rubrum*, no. 3 of Dr. Masters's table, is the common one grown in Holland. A handsome [illegible] *f. rubrum multiflorum*, which I have had from Messrs. Ver[illegible]ren and Son, comes here [illegible] always [illegible] and very [illegible] coloured. *f. purpureum* [illegible] another good form: [illegible] I [illegible] [illegible] flower.

7. *f. speciosum album*, no. 4 of Dr. Masters's table, is the white variety commonly grown. I [illegible] [illegible] *speciosum roseum* and *punctatum*, and is generally a weaker [illegible] and rather [illegible].

[illegible] and 2 of Dr. Masters's [illegible] called *carminiflorum rubrum* and *album* [illegible] [illegible] [illegible] [illegible] of these which are very [illegible].

[illegible] [illegible] [illegible] [

Lilium Canadense.

LILIUM CANADENSE.

THE CANADA LILY

L. canadense, Linn. Sp. 4[illegible] Bot. Mag. t. 800 et 858. Bury, Hexandr. t. 12. Flore des Serres, t. 1174. A. Gray, Man. p. 5[illegible] Baker, Linn. Journ. xiv. p. 240.

L. penduliflorum, DC. in Red. Lil. t. 105.

L. pendulum, Spae, Mon. 26.

Bulbus annuus, stoloniferus, squamis crassis obtusis albis. Caulis 1½–4-pedalis, gracilis, glaber, teres, viridis. Folia [illegible] verticillata [illegible] superiora [illegible] formam deplanata [illegible] accessorum plus minusve distincta, oblanceolata acuta, 3 [illegible] poll. longa, supra medium 6–9 lin. lata, viridia, tenuia, 5–7-nervata, venis interdum ciliatis. Flores vel pauci umbellati, vel corymbosi, pedicellis [illegible] poll. longis, apice valde cernuis, interdum bracteolatis. Perianthium 2–2½ poll. longum, late infundibuliforme, rubro aurantiacum, segmentis oblanceolatis, 6–7 lin. latis, supra medium fuscatis, facie copiose vinoso punctatis, dorsum versus carinatis compressis, margine glabris. Filamenta perianthio [illegible] breviora, [illegible] lin. [illegible] Ovarium subcylindricum, 3 lin. longum, stylo subrecto paulo brevius. Capsula turbinata, obtuse angulata, 1½ poll. longa, apice haud umbilicata.

Hab. America borealis orientalis a Canada ad Georgiam.

Bulb annually produced at the end of long or short stolons, composed of thick, white, fragile scales. Stem 1½–4 feet high, erect, green, terete, glabrous. Leaves oblanceolate, 5–7-veined, glabrous, usually in whorls of 3–12, or in some cases scattered on the stem. Flowers 1 or several in a whorl or corymb, on pedicels 3–9 inches long, usually bracteolate. Perianth 2–2½ inches long, the divisions more or less spreading and recurved, varying from yellow to bright red, with numerous purplish spots. Filaments 1½–2 inch long, anthers 4–6 lines, pollen crimson. Style straight, twice as long as the ovary. Capsule about [illegible] inches [illegible] with [illegible] ridges.

THE Canada Lily is perhaps the best-known of all the American species, and has been in cultivation since the time of Parkinson, who, in his delightful 'Paradisus, or Garden of Pleasant Flowers,' published two and a half centuries ago, describes it under the name of *Lilium martagon canadense maculatum*. It is one of the commonest species all through the eastern states, from Canada to the mountains of Georgia, and extends as far west as the Missouri river and probably at a higher latitude even further. According to Mr. Hanson it is also found in the Indian territory, but I have seen no specimens of the typical plant from [illegible] and Nevada or Pacific States, and I am inclined to think that it is replaced there by forms of *L. pardalinum*.

It grows in grassy flats, sandy meadows, and marshy places, but not in such wet ground as *L. superbum*, and is an extremely variable plant both in bulb and flower. There are several well-marked varieties among which the following are most conspicuous. *L. canadense rubrum*, figured in Bot. Mag. pl. 858, is usually a small and few-flowered plant, and is found, as Mr. Hanson tells me, in dry meadows along the Hudson river. *L. canadense flavum*, as figured in my plate, fig. 3, is also a small plant, with the flowers of an Indian yellow colour, and the divisions of the perianth not much reflexed. It is common in all the eastern States.

L. canadense superbum, fig. 1 on my Plate, is almost intermediate between the typical *L. canadense* and *L. superbum*, which according to Prof. A. Gray passes into it. It is a larger, more floriferous, and finer plant, bearing from 3 [illegible] to 8 flowers in [illegible]. The perianth-segments in this plant are much more reflexed, but never, as far as I have seen, show the green patch at their base, which distinguishes *L. superbum*. The bulbs of this variety (see fig. 4) are usually much larger and more compact than in the others, and I believe grow in wetter ground. Mr. Hanson tells me he has found it at Green Bay, Wisconsin, and elsewhere. In Mr. Maw's garden I observed a very similar form which had been [illegible] from Hamilton, Ontario, and in the herbarium of the Jardin des Plantes at Paris is a specimen of this type from Cove Valley, Pennsylvania, with pedicels [illegible] long.

The curious narrow-petalled variety (fig. 2) is from Long Island, New York, where Mr. Hanson [illegible] it is abundant, and its bulb, which I have shown in fig. 2, is also very different from the other, and more resembles the bulbs of the typical form. I have no doubt many other well-marked varieties have been and will be found. I do not think they need ever be confused with *L. parvum* or *L. columbianum*. Of the plant described by Prof. Wood in the 'Proceedings of the American Academy' 1868, p. 166, as *L. Watkinsi*, and considered by Mr. Baker a variety of *L. canadense*, I know nothing, and should rather take it to be a form of *L. parvum*, which [illegible] under *L. canadense* by the same author, as I think I have shown in a recent number of [illegible] work [illegible] by [illegible].

I [illegible] the [illegible] of the Victoria [illegible] Asters [illegible] to prove upon the [illegible] a few [illegible]. The [illegible] I [illegible] of the [illegible] to the constancy of [illegible] [illegible] [illegible]

LILIUM AURATUM.

THE GOLDEN-RAYED LILY.

L. auratum, Lindl. Gard. Chron. 862, 644; Hook. Bot. Mag. t. 5338; Flore des Serres, t. 1523–31; Ill. Hort. x. t. 373; Gn. Chron. Hort. 1867 i. 371; Miquel, Ann. Mus. iii. 156; Baker, Linn. Journ. xiv. p. 2.

L. Dexteri, Mag. Hort. Aug. 18[illegible].

L. [illegible], Springer. & Kerl. Wochenschr. [illegible].

L. speciosum imperiale, Hort.; Siebold.

Bulbus sereniss. globosus, 2–4 poll. latus, brunneus vel fusco-brunneus, squamis crassis lanceolatis [illegible] subtus nudis. Caulis 3–6 pedalis, viridis vel purpureo tinctus, gracilis, teres, glaber. Folia 20–160, [illegible] inferiora lanceolata, 3–5 poll. lata, acuminata, viridia, glabra, firma, [illegible] 3–5 poll. lata, acuminata, [illegible] Racemus 3–10 florus, [illegible] Perianthium [illegible] album, medio sepalorum aureo-vittatis, punctis purpureis sparsis, deorsum facie papillosis, foveolis [illegible] marginibus glabris. Filamenta [illegible] antheræ [illegible] Ovarium [illegible] Capsula [illegible] *L. speciosum* [illegible]

Hab. Japonia in collibus apricis sylvaticis. Formæ adsunt floribus rubro-vittatis, floribus albis immaculatis, et pluribus variabilibus [illegible]

Bulb nine to 12 inches broad, globose or flattened, composed of many thick, closely compressed, curving, lanceolate scales, yellowish [illegible] Stem 3–6 or more feet high, [illegible] Leaves numerous, scattered, lanceolate, acuminate, 3 to 5 inches broad, [illegible] Flowers in wild specimens from 1 to 10, but in cultivated ones [illegible] as 30 to 40 on a stem; the pedicles rigidly erecto-patent, bracteolate, 3–4 inches long. Perianth-segments [illegible] 6 to 8 inches long, 2 inches broad near the middle, tapering gradually to the base. The outer 3 are [illegible] the inner 3 [illegible] broad near the middle. The colour is, in the ordinary form, white, with a distinct central band of yellow, and numerous pink [illegible] or crimson spots; but there are some varieties with a pink or reddish crimson band, and others with a very pale lemon band, others almost pure white, the lower part of the perianth-segments covered with papillæ, and a green keel or midrib at the back. Flower when expanded 8–13 inches across, strongly and pleasantly scented. Filaments 3–5 inches long, [illegible] 1 inch; pollen scarlet or chocolate-red; ovary 12–16 inches long; style 3–4½ inches. Capsule 2–3 inches long, broader towards the apex. Seeds yellowish brown.

THE arrival of this splendid plant from Japan probably created a greater sensation in England than almost any introduction of recent years, and has perhaps done more to attract the attention of gardeners to the long neglected but beautiful genus than any thing else. Though *L. speciosum* is considered by some to be the queen of Lilies, I must give my preference to *auratum*, a thriving plant of which is, to my eye, the most beautiful floral production that can be seen.

Though one of the commonest wild flowers in many parts of Japan, the golden-rayed Lily was not introduced (and was indeed hardly spoken of) in Europe until the year 1860 or 1861, when it was first sent over [illegible] at. This was not, however, the first attempt made to introduce it as [illegible] Von Siebold had sent it as far back as 1829 to the Botanic Garden at Ghent. None of these plants, however, arrived alive, so that until the opening of the port of Yokohama to European commerce [illegible] we know.

In 1861, however, it was introduced by no less than four different persons. Dr. Von Siebold sent it again to Belgium under the name of *L. speciosum imperiale*. Mr. Charles Dexter sent it to America, where it was exhibited at a show of the Massachusetts Horticultural Society in July 1862, and named *Lilium Dexteri* by M. Hovey. Mr. R. Fortune and the late Mr. John Gould Veitch, both of whom were travelling in the East in search of plants, were not long in getting hold of this one, and a good number were despatched to London, where they arrived in fair condition. Messrs. Veitch and Sons, of Chelsea, knowing their value, bought nearly all that were offered for sale, and [illegible] Dr. Lindley *Lilium auratum*.

[illegible] bulbs of bulbs have been imported, and though the loss from careless packing, bad cultivation and the natural delicacy of the plant has been something terrible, there is hardly a garden, large or small, where it is not grown and valued. In its own country it is abundant, growing almost by acres in some of the woods and in a light moist soil on the hills near Yokohama. It is called *Yama-Juri*, or Hill-Lily, by the Japanese, who, great lovers of Lilies, do not, according to Mr. Kramer, one of the principal exporters in Japan, [illegible]

The bulbs are collected from the environs of Yokohama and other places about the end of October in great quantities, and packed in boxes of 200 or 300 [illegible]. If the season is wet, the bulbs not properly ripened, or the cases exposed to much heat on the voyage, as is too often the case, the majority arrive rotten, and I grieve to say that hundreds of cases are lost almost every year from one or other [illegible].

A new way of packing [illegible] has been discovered, by which the bulbs arrive in England almost as fresh as when they were taken up. Many thousands have been sold at Messrs. Stevens's rooms during recent winters in splendid order, and at a price so low that there can hardly be much profit to the exporters. Formerly they were packed in a loose yellowish earth, which filled up the space between the bulbs and kept them firm in the box; but now each bulb is enclosed separately in a ball of mud or clay which hardens round it, and, by keeping out the air, preserves it in a perfectly firm and fresh [illegible].

Still there is something in the constitution of this plant which seems to make it very liable to decay and death; and the number of bulbs that perish annually in England would hardly be believed. In a dry season like 1874 they sometimes go off quite suddenly, the leaves first fading, and the stem and flower-buds withering without any apparent cause. Out of a batch of 20 or 30 plants perhaps only 3 or 4 will remain alive two years after their arrival in England, but these, if well managed, will go on improving and increasing till they produce magnificent specimens. The cause of this disease does not seem to be yet fully understood [illegible] gardeners have suffered from it, and though in some favoured spots the Golden-rayed Lily will probably live and thrive permanently, it does not seem to find the soil and climate of England generally congenial to it. About its hardiness, however, there is not a doubt, and as there is no difficulty in raising it in large quantities from seeds or scales, I do not think we are likely to run short of it even if the annual supplies from Japan should fail.

With proper treatment and attention I believe the Golden-rayed Lily can be grown to greater perfection in pots than in the open ground, and though this is of course the most troublesome method, yet the plant is so well suited to the decoration of conservatories and halls that it is the one chosen by most people.

The treatment that I have found by experience the most successful is as follows:— On receipt of the bulbs, which should be purchased early in the winter (home-grown ones being in most cases to be preferred to imported ones), they should be potted singly in pots from 5 to 8 inches in diameter, according to their size. The pots must be well drained, and filled about half full of a mixture of loose fibrous peat and soft yellow loam, well mixed with coarse silver sand. The bulb should then be put in and covered with the same compost to within 1 or 2 inches of the rim. The pots should then be plunged in ashes, cocoanut-fibre, or some similar substance, in a cold frame, orchid-house, or shed where the frost cannot enter, and covered up with leaves or straw. In from two to three months they will begin to shoot, and should then be uncovered, and placed in a light and airy place, not too much exposed to the direct rays of the sun. Water must be given [illegible] when the [illegible] advanced copious supplies are necessary, and the soil from first to last must never be allowed to get hot or dry. *Aphides*, which are very fond of and injurious to the young growth of Lilies, must be carefully sought for and destroyed, or they will injure the flowers. As the stem begins to throw out roots a good surface-dressing of rough peat must be put on, and very weak liquid manure may be occasionally given, if the plants are well rooted and growing freely, otherwise it does harm, and it must never be used too freely.

During the growing-season the plants should be kept in a cool greenhouse, and well syringed at night, or may be plunged out of doors in a sheltered and half shaded position, where they will bloom later. If they grow very strong, they may be shifted into larger pots without injury about May or June, and when once bulbs are well rooted they thrive better in large pots than in small ones, as the soil is kept in a more regular state of moisture. If, however, a number of imported bulbs are potted together in one pot, they will probably flower at different times, and so spoil the effect.

The greatest success is usually obtained with bulbs that have been grown two or three years in England [illegible]

and these frequently attain a height of 5 to 7 feet, and produce as many as 20 to 30 or even more flowers on a single stem. They vary much in size and colour as well as in habit—some plants bearing flowers only at the top of the stem, and others nearly halfway down it.

After blooming the pots must by no means be neglected or allowed to become dry, as they so often are. Their success in the ensuing year depends to a great extent on the roots being active for as long a period as possible, and this is only to be ensured by careful watering. If they are repotted annually, which is the practice of many growers, it should be done as soon as the stems have completely withered, and with as little disturbance to the roots as possible. The stem, however, should always be cut off close to the bulb, removing with it the mass of roots, which having fulfilled their function of nourishing it during the growing-season, are now useless. A fresh top-dressing being put in, the pots should be returned to their winter quarters, and kept in a state of gentle moisture, neither dry nor wet, until the new growth again appears.

As regards the conditions under which this plant succeeds best out of doors I cannot do better than refer my readers to an account of the garden of James M'Intosh, Esq., at Oatlands Park, Weybridge, which was published in the 'Gardeners' Chronicle' for December 18, 1875.

The extraordinary success which has been obtained here is in my experience unequalled, and is, I think, due principally to the soil and situation of Mr. M'Intosh's garden, which slopes gently to the north, and is well sheltered by trees from wind. The soil is very light, but always moist below; and the Lilies are all planted on the edges of rhododendron-beds, where they are protected from spring frosts and the soil is sheltered from the sun. Here they attain a height of 6 to 12 feet, bearing commonly 20 to 40 flowers on a large stem, and blooming at various times from July till the end of October, the middle of August being the time when they are usually seen in the greatest perfection.

Lilium auratum ripens seed freely under favourable conditions, and may be propagated in this manner with moderate care, though the seedling lies for more than a year before germinating. I have not yet been able to ascertain the reason why seeds ripened and sown at the same time vary so remarkably in the period of germination. A few usually come up in the first season, and the majority in the second; but some lie dormant for as much as thirty months.

The plant which I have figured is by no means so fine as is often seen, either in the number or size of its flowers; but a Plate of double this size would not contain a really large specimen.

The variations are so numerous that hardly two plants in fifty will be exactly alike, but no striking departure from the typical form exists.

The plant known as *L. rubrovittatum* is an extremely scarce and beautiful variety, which I hope to figure in a future Plate. It has the yellow band replaced on the upper part of the petal by more or less deep red, in rare cases almost crimson, and appearing, much more frequently, however, the red tint is pale, and fades after the flower has been out a few days.

A somewhat similar and even more beautiful variety was figured in the 'Floral Magazine' for November 1876, under the name of *L. auratum cruentum*, differing from the last in the crimson band, which in the centre is extremely dark, being continued to the very base of the petal.

LILIUM ELEGANS.

THUNBERG'S LILY.

L. elegans, Thunb. Mem. Acad. St.-Petersb. v. 203, tab. 9. fig. 2, 1811 Baker Journ. Linn. Soc. xiv. p. 2

L. bulbiferum, Thunb. Linn. Trans. ii. 3-3

L. philadelphicum, Thunb. Fl. Jap. 1

L. Thunbergianum, Schultes fil. Syst. Veg. vii. 415, Lindl. Bot. Reg. 1839, t. 33 Maund. Bot. t. 58 Regel, Gartenfl. 187- Baker, Gard. Chron. 1871 Duchartre. Obs. 32

L. aurantiacum, Paxt. Mag. vii. 147

Obs. *L. bulbifero* et *L. croceo* similis, sed minor. Caulis 1–2-podalis, [illegible] glaber [illegible] purpureo-rubrinus, sulcatus [illegible] 20–30, ascendentia spatia [illegible] pluria, diutius [illegible] [illegible] [illegible]

I have studied the numerous forms of Orange Lilies cultivated in the gardens of England and the Continent, with much care, and have to thank especially Mr. Wilson, Mr. J. H. Krelage, of Haarlem, and Mr. P. Barr of King Street, Covent Garden, for the facilities they have given me in visiting and examining their [illegible] collections; but though the paper by Messrs Baker and Dyer in the 'Gardeners' Chronicle' for [illegible] is a most valuable contribution to the history of the group, I am unable to follow it in all respects. The fact is, that the Japanese Orange Lilies have been crossed extensively with the European ones, and it is therefore impossible to refer many of the garden forms to either species. One thing, however, I think probable is, that the forms grown under the name of *L. dauricum* have, with one exception, nothing to do with the true *L. dauricum* of Siberia (which has a very different bulb), but are more likely hybrids between *L. elegans* and *L. croceum*.

The varieties of *L. elegans* which I think most distinct and worthy of notice are as follows:

1. *L. elegans*, as figured in the 'Botanical Register,' vol. xxv. t. 38. 1–2 feet in height, with broad leaves [illegible] and unspotted flowers of a deep reddish orange. This may be considered the type of the species.

2. *L. elegans*, var. *bicolor*, Moore, Floral Magazine, t. 104. Under a foot high. Stem glabrous, leaves crowded; flowers scarlet towards the edge, orange in the middle of the petals, with few spots.

3. *L. elegans*, var. *alutaceum*, Baker and Dyer (*L. Thunbergianum aurum nigro-maculatum*, Flore des Serres, t. 1527, and grown under this name in the Dutch and Belgian gardens). The dwarfest form of all, under a foot high, with two or three, large, apricot-coloured flowers freely spotted with black. A most desirable and handsome variety.

4. *L. elegans*, var. *Alice Wilson* (hort. Wilson). Resembles the last in colour, but brighter, with fewer spots, and considerably taller. A very pretty variety, which I have only seen in Mr. Wilson's garden.

5. *L. elegans*, var. *sanguineum*, Lindl. Bot. Reg. 32, t. 50 (*bulbiferum* hort.). A fine, dark-red variety of moderate height, with open segments of a deep red colour, moderately spotted, but not so dark as the next.

6. *L. elegans*, var. *atrosanguineum*, Baker and Dyer (*L. hæmatochroum*, Lem. Ill. Hort. t. 503; *L. Thunbergianum, grandiflorum*, hort. Ant. Roozen and Krelage). A taller form, with very dark crimson flowers, rather narrow petals and black spots.

7. *L. elegans*, var. *venustum*, Kunth, Enum. iv. 265; Flore des Serres, t. 657 (? *L. elegans*, Wall. Spec. Mus. p. 29), Lem. Ill. Hort. t. 422. The latest variety of all, coming into flower a fortnight after the others have done blooming, and after many of the others have gone to seed, and bearing 4–7 flowers, which are clear red with few spots.

8. *L. elegans*, var. *pardinum*, Moore, Flor. & Pom. 1868, p. 21 (*L. Wilsoni* hort.). This variety differs from all others in its habit and general appearance, as well as in its creeping stem, which resembles that of *L. Leichtlini*. It is quite possible that this may be a hybrid between *L. elegans* and some other species, but in the absence of any information on the subject, I prefer to leave it with the species for the present.

There is also a monstrous form, *L. fulgens*, var. *staminosum*, Lem. Ill. Hort. t. 422, in which the bracteoles are changed into imperfect petals; but it has no beauty to recommend it.

I am indebted to Prof. Maximowicz of St Petersburg, for the following Notes on *L. elegans* as observed by him in Japan. "It is very near *L. dauricum*, whose capsule it has, but seems to differ by the narrower wing of its seeds, broader leaves, (in the spontaneous, and often also in the cultivated plant) in the flower, which is red throughout, and not yellow at the base as in *L. dauricum*, and in the less dense pubescence, but the principal difference is the solid bulb. I have this species wild, only from the north of Nippon, from two localities, where it seems to grow in clayey soil, but it is cultivated in many varieties among all Japan. The wild plant is a span high, the flower red, with dark spots. The cultivated ones are [illegible] in various colour.

The Japanese distinguish also a spring and a summer form. The former, with narrower leaves and

a more open flower, they call 'Haru-sukashi-yuri,' and the latter, with broader leaves and narrower flowers, 'Natsu-sukashi-yuri.' I have not seen this second form.

L. bulbiferum, L., with which *L. elegans* was often confounded, differs remarkably in its elongated capsule which is deeply umbilicate at the apex, and sometimes (not always) by its axillary bulb.

"*L. dahuricum*, Gawl., is also found abundantly on the island of Yeso, about Hakodadi, where it grows in grassy places, crevices of rocks, and on borders of fir-woods. It is possible that some of the varieties of *L. elegans* have been bred in Japan between this species and *L. dauricum*, in the same way that they have appeared in Europe between *L. dauricum* and *L. bulbiferum*." There is reason to suppose that a Lily of this type is found in a wild state in the north of China, but having seen no dried or living indigenous specimens from that country, I cannot be sure to which species it belongs.

The cultivation of *L. elegans* and its varieties is easy: it requires nothing more than a good rich sandy soil, well drained, but not too shallow; and though it sometimes grows well in a peaty soil, it is not necessary for this as for some Lilies. In pots it also grows well if properly attended to, and produces seed which germinates quickly, and grows more rapidly than in the case of the Martagon, though great care must be taken of the young plants in their earlier stages.

My first Plate represents three varieties: on the left hand is *L. venustum*, in the centre, *L. alutaceum*, and on the right, *L. atrosanguineum*,—all of which were drawn from plants which flowered in my garden in 1876.

The second Plate represents the variety *Alice Wilson* on the right,—on the left the variety *L. incomparabile* which I believe to be a hybrid between *L. elegans* and *L. bulbiferum*: on that account I have not mentioned it among the varieties of this species, though for garden-purposes it is one of the best forms which are commonly grown.

LILIUM CORDIFOLIUM.

THE HEART-LEAVED LILY

L. cordifolium, Thunb. in Linn. Trans. ii. 332; Sieb. et Zucc. Flor. Jap. vol. i. p. 33, tt. 13, 14; Miquel, Ann. Mus. Lugd.-Bat. i. p. 1; Franch. & Savat. Enum. Japon. vol. ii. p. 72; Baker, Linn. Journ. xiv. p. 227; Ind. Mag. [illegible] Gard. Chron. 1874, vol. ii. p. 395, fig. 6.

Hemerocallis cordifolia, Thunb. Fl. Japon. p. 81; Curtis, Perict. ii. 84, t. 149, fig. 5.

Bulbus ut *L. giganteo* similis sed minor, squamis paucis crassis. Caulis 3–5-pedalis, pede infimo nudo, foliis primum sub-2-stichis congestis. Folia primordialia ovata, profunde cordata, longe petiolata, nitide viridia, venis sanguineo tinctis. Racemus 4–12-florus, vix pedalis, expansus 9–14 poll. latus, pedicellis floriferis patentibus, 3–8 lin. longis, bracteis ovatis acutis caducis. Perianthium anguste infundibuliforme, 4–6 poll. longum, tubo e basi 3–4 lin. ad collum 12–15 lin. latum sensim ampliato, segmentis e basi quadratâ superiore 6–9 lin. lata ad basin angustatis. Stamina perianthio triente breviora, antheris lineâ 4 lin. longis. Capsula ut *L. giganteï* sumus sed in mor

Hab [illegible] in Japonicæ et Koriæ[illegible] in sylvis umbrosis, alt. 400–600 pedes (Oldham, Maximowicz). Kuikung, Chusu (A. Dav[illegible] Montibus prope Hankow (Ramsay). Ningpo (Fortune).

Bulb [illegible] same character as that of *L. giganteum*, but smaller and composed of fewer scales. Stem 3–5 feet high, not clothed [illegible] leaves [illegible] the base, not having a few [illegible] ones a foot from the ground, and smaller [illegible] towards [illegible] inflorescence. Lower [illegible] shining grassy green, with a coppery [illegible] in a young state, [illegible] furnished with a broad flat petiole, blade sometimes nearly a foot long, prominently cordate, roundish or ovate, the veins tinged with purple and [illegible] reticulate. Raceme from [illegible] 0 inches long, 4- to [illegible] or 8-flowered; pedicels short and stout [illegible] large, ovate, falling before the flowers expand. Perianth funnel-shaped, 5 or 6 inches long, milk-white outside, tinged with green towards the base; segments obtuse, oblanceolate, spreading laterally in their upper half, narrowed gradually to the base, the three inner ones yellowish inside at the base, and spotted with purplish, without any papillæ or distinct groove. Stamens parallel, [illegible] ly declinate at the [illegible] shorter than the perianth; ovary obtusely [illegible] style parallel with the stamens, and [illegible] ly [illegible] segments [illegible] [illegible] [illegible]

to decide [illegible] I am [illegible] of residents and travellers [illegible] and [illegible] we [illegible] to clear up [illegible]

It seems that this Lily was first introduced from China about the year 1862 by Mr. [illegible] bulbs to Mr. Noble, of Bagshot, with whom they flowered. The [illegible] though it has been raised from seed by Herr Max Leichtlin in some quantity and is so [illegible] in small numbers, I do not think it will ever become as popular a plant in our gardens as [illegible] being apparently of a more delicate constitution and much inferior in beauty.

There was some correspondence on the subject of this Lily in the 'Gardeners' Chronicle' for 1877, which tends to show that the variety first introduced by Mr. Fortune, and which, as I have said, probably came from China, was taller, more floriferous, and otherwise finer than those now in cultivation. There is also a considerable difference in the arrangement of the leaves, which are not always arranged in a regular whorl, but are sometimes scattered.

As this plant produces its leaves very early in the spring, and they are much injured by frost, it is desirable to protect them with a hand-light, and care must be taken that the beautiful bronzed foliage is not injured by sun and wind.

Though it has been successfully grown by Herr Leichtlin, M. Kaelaor, and others, I have never myself been fortunate enough to flower the plant, and am indebted to Sir Joseph Hooker for permission to figure one which flowered in the Royal Gardens at Kew in July 1877.

The capsule, which is the only one I have seen, was grown by Mr. Mackintosh, of Oatlands Park, Weybridge, and though probably not fully developed, contained a few good seeds, and shows the peculiar shape very fairly.

Lilium Washingtonianum

LILIUM WASHINGTONIANUM.

THE WASHINGTON LILY.

L. Washingtonianum, Kell. Proc. Calif. Acad. ii. 43, 1863. Wood, Proc. Acad. Phil. 1868, 106; Baker, Gard. Chron. 1871, 76 and Journ. Linn. Soc. xiv. p. 282. Regel, Gartenflora, t. 710, Duchartre, Obs. 89. Flore des Serres, t. 1976.

L. Bloomerianum, Kell. Proc. Calif. Acad. ii. 43, 1863.

Bulbus obliquus, albus, subglobosus-conicus, squamis parvis lanceolatis. Caulis 5–8-pedalis, teres, glaber viridis, supra medium rarius infra racemum nudus. Folia in verticillis 6–12-folialis disposita, vel superiora sparsa, oblanceolata, patentia, sessilia, glabra, 4–5 poll. longa, supra medium 8–12 lin. lata, acuta, viridia, e medio ad basin sensim angustata, venulis lateralibus obliquis indistinctis. Racemus 4–5-pedalis, 12–30-floris, expansus 8–9 poll. latus, pedicellis ascendentibus, inferioribus 2–4 poll. longis, superioribus gradatim brevioribus. Perianthium suave roseum, extrorsum albidum, intus albidum, 6 poll. longum, non revolutum, tubo pro ratione ventricoso, limbi patentis laciniis sparse segmentis obtuse-ovatis basi vix unguiculatis 3–3½ lin. latis, ad basin sensim angustatis, flore expanso triente vel quadrante superiore falcatis. Staminum perianthio quadrante brevia, antherarum loculis divergentibus, 4 lin. longis. Ovarium 8–9 lin. longum, stylo curvato subito dilatato.

Hab. California, Oregon, at alt. from 3000 to 6000 feet. Jeffrey, Bridges, Lyall, Kellogg, &c.

Bulb oblique subglobose-conical, composed of long narrow whitish scales attached at their base to a horizontal axis. Stem 5 feet high erect terete glabrous, leafy in several distinct whorls, 6 to 9 inches or more apart, made up of 6–12 oblanceolate spreading leaves, 4 inches long by 1–2 lines broad, glabrous, more or less keeled on the edges, sometimes scattered on the upper part of the stem. Flowers 8 to 30, in a racemo reaching a foot long. Peduncles ascend up 2–4 inches long with a lanceolate bract at the base of each. Perianth white or pale, more or less tinged with purple on the outside, and spotted on the inside with green, 6 inches long, segments obtuse-ovate, narrowed to the base not papillose. Ovary 8–9 lines long style 1½–3 inches, curved towards the top, slightly exceeding the filaments, anthers yellow, 6 lines long. Capsule resembling that of *L. Humboldtii*.

THE Washington lily was probably first brought to notice by Dr. Kellogg, of San Francisco, who exhibited a dried specimen and figure of the plant at a meeting of the Californian Academy of Sciences in 1854. It had previously been found by Jeffrey, who sent specimens to the Kew Herbarium, gathered in 1853. The plant however was not described till 1863, when Dr. Kellogg gave it the name of *Lilium Washingtonianum*, and it was again described by Prof. A. Wood under the same name in 1868.

Notwithstanding its beauty, this plant was not introduced into our gardens until recently, when Roezl, the well-known botanical traveller, having been put on the scent by Herr Max Leichtlin, of Baden, sent him a consignment of bulbs from California, which arrived in 1869. Shortly after this it flowered in Mr. Leichtlin's garden, and was figured by Dr. Regel in the 'Gartenflora,' and also in Mr. Van Houtte's 'Flore des Serres.' In 1871 and 1872 large quantities were collected by Mr. Roezl and sent to Europe, which have now found their way into the hands of most amateurs and nurserymen.

Though this plant has not hitherto quite realized in gardens the high expectations that were formed of its beauty, there is no doubt that the better varieties, when well established, will rank among the finest Lilies.

In considering the best means of attaining this object we must first describe the soil and climate of its native habitat.

Dr. Kellogg says in the 'Garden,' January 3, 1874:—"It occurs in the Cuyumaca Mountains in San Diego county (its most southern known limit at present), northward along the western slope of the Sierra Nevada between 3800 and 6000 feet elevation, in Oregon to the Columbia river, and on the coast-ranges north of San Francisco, especially in the eastern parts of Mendocino and Humboldt counties. In all the localities named it occurs either on ridges, or on lightly shaded slopes of ridges having a porous loose soil resting on a gravelly subsoil. At no time have I met with a plant of this species in a soil of which the drainage was not perfect, or which when found on a slope, did not face to some point between east and south. The pale, loosely-scaled, ovoid bulbs are found at a depth of 12 to 20 inches. The height of the stem, the number of whorls and of flowers on a single stem, vary very much according to soil, position, and age of the bulb. Much has been said about the difficulty of naturalizing this beautiful species. I willingly confess that I have also met with many reverses until I paid proper attention to its habits and haunts. If the bulb be planted at a depth of from 8 to 12 inches in a loose, somewhat gravelly

[illegible] difficulty in obtaining satisfactory results. Although there is positively a specific difference between the bulbs and plants collected either on the Sierras or on the coast-ranges, yet I found that bulbs from the coast-ranges would always bloom more readily in San Francisco (i. e. in our house) than those from the Sierras. The reason is obvious, but it would be interesting to know if the same holds good of other plants.

Two things are evident from this account, viz. that the bulbs must be kept out of reach of the frost and must [illegible]. Though the heat of California both in summer and winter is (except at high elevations) much greater than that of England, yet the depth of the soil lying over the bulb would effectually prevent it from ever becoming either too hot or too cold. So great a depth would be unnecessary in Europe, but the drainage, whether in pots or in borders, must evidently be most carefully attended to, as the rainfall and dampness of our climate is greater than at San Francisco.

I am indebted to Mr. Hanson, of New York, who for many years has cultivated Lilies with great success, for the following notes on the species:—"*L. Washingtonianum* is found in almost every county in California and Oregon. The best variety that I have seen is from Jacksonville, Oregon, which had the bulbs and flowers very large, sometimes pure white, but generally spotted with purple, and occasionally with a yellow band. The soil in this part of the country is very rich, cool, and well-drained, which perhaps accounts for the luxuriance of the plant. I once received from Mr. Bolander, of San Francisco, three bulbs of *L. Washingtonianum*, the flowers of which were upright and trumpet-shaped, with the scent of a cowslip. It bore on one spike 21 flowers. There is a splendid variety, growing on the banks of Eel River, California, which has flowers of a light purple. All the varieties thrive in a deep, rich, loose soil and dry bottom, and are much averse to frost. They grow best in a frame filled with leaves and covered with a mat in winter. This way of protecting them will make the bulbs grow all the winter, but if the roots once rot, the bulb will also perish. I think the plant is well worth all the trouble expended on it, though for common gardening it is worthless."

The structure of the bulb in this species is very peculiar, though under cultivation it partly loses its characteristics. It is quite unlike the bulb of any other species, though that of *L. Humboldti* resembles it in some respects.

It consists of a horizontal rhizome, covered on both sides by a quantity of fleshy scales, of a dirty white colour. These scales are about 2–3 inches long, by half an inch wide, pointed at the top, and convex outside. Their bases are attached to the rhizome in such a way that those on each side face each other, and are rather sloping than vertical. The growth of new scales, instead of taking place in the heart of the bulb, as usual, is at one end only, and the scales gradually decay at the other end, so that the flower-stem is thrown up from one end of the elongated mass. The roots proceed from the base of the bulb, gradually dying away as new ones are formed under the advancing rhizome. The growth of 4 or 5 years, however, is visible in a large bulb, which will measure 5 or 6 inches in length by 2 or 3 in depth, and has a thickness of about 2 inches.

The variety of this plant which has been described by Mr. Baker as var. *purpureum* differs from the plant which I have figured, in the nearly erect position of its flowers, in its smaller size, and in other respects from the typical variety. Prof. Sereno Watson, of Harvard, proposes to separate it specifically under the name of *L. rubescens*, and has doubtless some good reasons for doing so. As, however, I should be unable to say to which species some of the plants I have seen ought to be referred, I prefer to keep them together, and will give a separate illustration of these forms in my next part.

The plant here figured flowered in the garden of Mrs. Bateman at South Kensington, in July, 1877, and for permission to figure it I am indebted to that lady, who cultivates Lilies in what would seem a most unsuitable situation, with as much ardour and success, as her husband Mr. J. Bateman, F.R.S., formerly showed in the cultivation of orchids.

The single flower represents the colour of the ordinary variety, which is much inferior in beauty to the one here figured.

LILIUM WALLICHIANUM.

WALLICH'S LILY.

L. Wallichianum, Schultes fil. Syst. vii. 1689. Wall. Cat. 5076; Hook. Bot. Mag. t. 4961; Lindl. & Paxt. Flow. Gard. 1849, cum icone. Lemaire, Jard.-Fleur. t. 105, 106; Flore des Serres, t. 612. Baker, Journ. Linn. Soc. xiv. p. 228.

L. japonicum, D. Don, Prodr. Nep. 52, non Thunb.

L. longiflorum, Wall. Tent. Fl. Nep. 40. t. 29, non Thunb.

L. Batuna, Hamilton MSS.

Bulbus ovoideus, 2–3 poll. crassus, squamis albis, acutis, marginibus scariosis. Caulis 4–8-podalis, virens, strictus, teres, glaber. Folia sparsa, linearia, glabra, enervata, 5–9 poll. longa, 6–9 l. lata, superiora breviora, latiora, sæpe 5-nervata. Flores solitarii vel 2–6 umbellatim, bracteati. Perianthium album, extus basi virinulum, 7–9 poll. longum, segmentis inferioribus deflexis. Stamina perianthio 2 poll. breviora; antheris luteis, 12–14 lin. longis. Ovarium 1½–2 poll. longum.

Hab. Regio subtemperata Himalayæ centralis et occidentalis a Kumaon ad Nepal, alt. 4000–6000 pedum.

Stem erect, 4–6 feet high. Leaves numerous, often very crowded, lanceolate or linear-lanceolate, glaucous, acuminate, indistinctly veined. Flowers terminal, drooping, solitary, or two or three from the same point, in which case the four or five upper leaves or bracts form an involucre. Perianth-segments 8–10 inches long, broadly ovate, lanceolate, and spreading above, the lower part extended into a long claw. Flower fragrant, delicate, creamy white, tinged green or yellowish outside, especially on the lobe. Stamens 2 inches shorter than the perianth; anthers 1 inch long, pollen yellow. Style longer than stamens; stigma large, capitate, with three gibbous reflexed lobes.

THIS fine Lily was originally discovered by BUCHANAN HAMILTON in Nepal in 1802, and was sent to Europe under the native name of *Batuna*. WALLICH next found it on Sheopore, a high mountain near Kathmandu in 1820. He published a figure and description of it under the name of *L. longiflorum* in the 'Tentamen Floræ Nepalensis,' from which SCHULTES was led to consider it a distinct species. It was introduced in a living state by MAJOR MADDEN in 1849, and was figured in the 'Botanical Magazine' and Lindley and Paxton's 'Flower Garden' in the following year. DR LINDLEY says:—"We received it last year from MR. D. MOORE, the skilful curator of the Botanic Garden at Glasnevin, to which it had been sent with many other plants from Almorah by MAJOR MADDEN. The bulbs arrived in April, and on the 10th August the plants were 4 feet high."

The root figured in the 'Botanical Magazine' is so very unlike the bulb of this Lily, that I supposed it to have been inserted by mistake, but DR. WALLICH, from whose plate in the 'Tentamen' the root was copied, says:—"The base of the stem I have repeatedly found horizontal, creeping, and scaly, like that of a fern, without any remainder of a bulb, but marked with a number of vestiges of the stems."

This peculiarity, which I can hardly doubt when we have it on such good authority as that of DR. WALLICH, has, as far as I know, not been observed in any other species of Lily, or by any other writer. The bulbs which I have examined are quite of the same type as those of other oriental Lilies, they may, however, be easily distinguished from any other by the scarious edges of the scales, which are closely pressed together, and pointed at the top.

The best account we have of the native country of this Lily is given in a letter from a correspondent of MR. BARR's, printed in the 'Garden' for January 24, 1874.

Writing from Masuri he says:—"*L. Wallichianum* flowers in August or September, more usually the latter. It is a hardy plant, and here defies both heat and cold. I find it growing at an elevation of 5500 feet on the open grassy hills, on a slope of 45°, not in the shelter of the forest, in a soil full of limestone pebbles, the matrix composed of lime, clay, and vegetable mould. On account of the steep slope of the hillside it is thoroughly free from surplus water, the temperature of the summer sun being from 120° to 130°. From June to the end of September (which is our rainy season) it grows in a perfect deluge, and is often enshrouded in mist for days together. From September to December it gradually dies down in a fine warm temperature by day, with hoar frost at night in November. Little rain falls during these months. Sometimes there is but little snow in winter, with hard frost; at other times the snow lies 2 feet deep, but this is unusual. The bulbs are at from 6 to 9 inches depth, and are unmanured. The plant seldom or never produces seed, but is propagated by suckers or by bulblets from some part of a long root, so that the flowering plants are surrounded by numerous young ones of various ages.

Another correspondent writes —"*L. Wallichianum* is certainly a magnificent [illegible] I [illegible] in the [illegible]

[illegible] I do not think [illegible] whatever may be the powers of enduring cold of this [illegible] a very [illegible] [illegible] [illegible] necessary for it, and for this reason I do not think [illegible] [illegible] [illegible] [illegible]

[illegible] at the [illegible] which we have most faith in England we usually have [illegible] and [illegible] [illegible] [illegible]

LILIUM AVENACEUM.

FISCHER'S LILY

L. avenaceum, Fischer, Maxim. in Regel, Gartenflora, 1867, p. 290. t. 485. Baker, Linn. Journ. xv.

L. Martagon, Ledeb. Fl. Ross. iv. 149, ex parte.

L. medeoloides, Franch. et Savat. Enum. pl. [illegible] p. 6.

L. maculatum, Sc. Midden. vol. v. fol. 76.

Bulbus parvus, junior[illegible] squamis frigidibus, articulatis, linearibus, acutis. Caulis glaber, teres, 1½ 2-pedalis, infra sæpissime 6–9 ad medium caulis in verticillum dispositis, raro in verticillos duos vel sparsa, horizontalia oblanceolata, 3–4-poll. longa, supra medium 6–18 lin. lata, glabra, tenera. Flores 1–2, in racemo vel interdum subumbellata, bracteis parvis, pedicellis apice cernuis solitis 2–[illegible] longis. Perigonium subcampanulatum, [illegible] extentum, 5 cm. in longum, segmentis [illegible] 4–6 lin. latis, apice carnosis, intus in sicco purpureo-nigris papillosis, fovea glabra, profunde excavata. Filamenta [illegible] longa, antheris parvis. Ovarium 4–5 lin. longum, stylo declinato duplo brevius. Capsula [illegible] longa, 9 lin. lata. Semina parva.

Hab. Kamtschatka [illegible] Sachalien Sesnowsky. Ins. Kurienses (Herb. Fischer). Japonia (Maximowicz).

Bulb small, white, composed of narrow, pointed, closely attached, jointed scales, the upper parts of which resemble in shape and size a grain of oats, from which resemblance the plant takes its name. Stem 1½–2 feet high, slender, terete, glabrous. Leaves usually in a single whorl of 6–9, but sometimes in a double whorl, or scattered, 3–4 inches long, 6–18 lines wide, narrowed upwards to a long acute point, thin in texture, and glabrous or faintly downy beneath, with 5–9 indistinct nerves. Flowers 1–2 or more, in an irregular corymb, or subumbellate, on slender bracteolate pedicels, drooping at the apex. Perianth 16–18 lines long, scarcely or [illegible] spreading, segments obovate-oblong, obtuse and faintly mucronate at the apex, 4 lines broad, thickened [illegible] for [illegible] of their length, papillose in the face with dark purple or black, not papillose, or pubescent on a groove. Filaments 12 lines long, anthers small. Ovary 4–5 lines long, shorter than the style. Capsule oblong, narrowed at the base.

THOUGH *Lilium avenaceum* appears to be a very common plant on the coasts and islands of North-eastern Asia our knowledge of its peculiarities is still somewhat deficient, and it was not until 1877 that I was able to procure a living plant of it for figuring. It was apparently discovered long ago by PALLAS, and afterwards gathered in Kamtchatka by by KITTLITZ, ESCHSCHOLTZ, and other travellers, but was not recognized or described as a distinct species until MAXIMOWICZ brought it to Russia in 1864, and described it from a plant which flowered in the Botanic Garden of St Petersburg.

This Lily has been somewhat confused with another species (*L. Hansoni*), which I have already figured but, without speaking of the great difference in the size, habit, and appearance of the plant, the structure of the bulb is so very different from that of *L. Hansoni*, or of any other Lily, except *L. medeoloides*, that I have no hesitation in separating them. It seems to resemble *L. tenuifolium* much more closely than *L. Hansoni*, and unless it grows much more luxuriantly in its native country than it has done in cultivation, I am at a loss to understand how it can ever have been confused with the latter.

PROF MAXIMOWICZ tells me it is common in Kamtchatka, and is also found in the Kurile Islands, South Sachalien, South Yeso, North and Central Nippon, growing in mountain-meadows and grassy [illegible] in good muck soil. It is commonly used as an article of food by the semisavage inhabitants of North-east Asia.

I am indebted to MR. PRINGLE, of Vermont, for three bulbs of this Lily, which he cultivates with more success in the climate of the United States than we can hope to do here. One of these, which I sent to Herr MAX LEICHTLIN, produced two flowers in June 1877. From this plant, and one which was exhibited by Mr WILSON at a meeting of the Royal Horticultural Society about the same time, my Plate was taken. The upright which I have not seen, being copied from the plate in the 'Gartenflora' for 1860. The delicate scales of the bulb of this Lily, which, from their resemblance to the grain of the oat, have [illegible] the specific name, appear to be very loosely attached, and, I am inclined to think, do not form offsets.

From what I can learn, I believe that a very moist cool soil and considerable summer heat are indispensable for the growth of this plant, which is not likely to become naturalized in our gardens.

LILIUM MEDEOLOIDES.

GRAY'S JAPAN LILY

L. medeoloides, A. Gray Mem. Amer. Acad. vi. 4. 5. Miquel, Ann. Mus. Lug.-Bat. iii. 156. Baker in Journ. Linn. Soc. xv. p. 238.

Caulis 1–2-pedalis, gracilis, teres, glaber, flexuosus. Folia in verticillum unicum 7–14-foliatum disposita, oblanceolata, tenuia, pauca superiora subulata, 4–8 poll. longa, supra medium 9–16 lin. lata, venis lateralibus 3–5 distinctis, paucis reductis saepe vix ullis. Flores solitarii vel 2–3 umbellati, pedicellis brevibus apice erectis. Perianthium 12–16 lin. longum, segmentis ut videtur [illegible] glandulis conspicuis [illegible] exteriora ante cuspidem exappendiculata, puberula, medio 3–4 lin. lata, basi leviter sculpturata, foveola carinaque decurrente glabra. Filamenta perianthium aequantia vel superantia 4–6 lin. longa. Ovarium in stylum 1 lin. longum [illegible] sulcis purpureis.

Hab. Japonia, prope Hakodadi (C. Wright). Insula Koreana, in sylvis inundatis, mense Junio florens (Oldham).

Bulb probably resembling that of *L. arenaceum*. Stem 1–2 feet high, slender, terete, glabrous. Leaves rather irregularly arranged in a single whorl of 7–14, or rarely in two whorls, with a few scattered on the upper part of the stem, oblanceolate, acute, 4–6 inches long, 9–16 lines wide, 3–5-nerved, quite glabrous. Flowers 1–3 or more, in an umbel of sometimes solitaries, 1–2 inches long, naked or bracteolate. Perianth 12–16 lines long, erect, the divisions falcate only near the tip, lanceolate, not narrowed into a claw, pale yellow, sparingly reddish yellow with a few purple spots, not papillose or pubescent. Filaments 6 lines long; anthers small; style longer than the ovate ovary.

Of this Lily we know less than of almost any other Asiatic species, and what we do know is not very certain. From its appearance in a dried state I should suppose that the plant is extremely like *L. arenaceum* in bulb, habit, and leaves, though it differs remarkably in the erect position of the flowers. On this account it has been classed by Mr. Baker among the *Isolirion* group, but I have figured it on the same Plate as *L. arenaceum* on account of its inhabiting the same islands, and being, as I think, more nearly allied to that plant than to any other Lily.

It was first made known to science by Prof. A. Gray, who described it from specimens collected by the United-States North-Pacific exploring expedition near Hakodadi, in Japan.

It must, however, be somewhat rare and local, as neither Maximowicz nor any other travellers have noticed it in Japan, or they have confounded it with other species.

Mr. Hogg tells me in a letter, "*L. arenaceum* is found growing in Fusiyama, whence I have received it. Whether *L. medeoloides* is distinct from it as a matter for inquiry, as the two appear to be sometimes confounded. The native name is 'Kuruma Yuri,' signifying the Wheel-Lily. The application of the name is probably to the marked position of the leaves in whorls." I am not aware that this plant has yet been cultivated in Europe with success.

A small number of bulbs have been recently imported under this name, one of which is figured in the Plate and which seem exactly similar to those of *L. arenaceum*. I cannot be sure, however, of their authenticity, but as I am unable to defer any longer the publication of this Plate, I must leave the matter to the investigation of travellers and residents in Japan.

The plant was drawn by Mr. Fitch from the excellent dried specimens in the Kew herbarium, which were collected by Mr. Oldham in 1862 in the Herschel Islands, part of the Corean archipelago. It is much to be wished that the extremely interesting flora and fauna of these islands and the Corea may not remain much longer almost entirely unknown.

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LILIUM CONCOLOR.

SALISBURY'S LILY

L [illegible] Salisbury Parad. [illegible] Bot. Mag. [illegible] and 608 Baker Journ. Linn. Soc. (Bot.) xiv. p. [illegible] Plant. Fasc. v. p. 64 (1877), Lem. Ill. Hort. t. 100.

Var. *α. typicum* Regel, ut supra

Bulbus solitarius; foliis oblongo-lanceolatis, obscure 7-nervis; sepalis obscure coccineis, immaculatis, apice patule recurvis

Loc. [illegible]

Var. *β.* PSEUDOCROCEUM, Fisch. & Lallem. Bul. Sem. Petr. 1840, p. 56; Gartenflora, t. 284 (1860), Rev. Hort. 1862, p. [illegible]; cone, Led. Fl. Ross. iv. p. 152; Turcz. Cat. Baic. n. 1104

L. Buschianum, Led. Bot. Cab. p. 1028

L. concolor pulchellum et *Buschianum*, Baker, Journ. Linn. Soc. (1880) xvi. p. 36

Bulbus solitarius; foliis late linearibus, sepalis coccineis, plus minusve punctatis, apice vix recurvis

Hab. Davuria et Mantschuria. China borealis (Maximowicz)

Var. *γ.* MINIATUM, Lindley in Paxt. Fl. Gard. ii. p. 180, t. 193; Van Houtte, Fl. des Serres, p. 1201

Bulbus caespitosus; foliis [illegible]; caule pruinoso, purpureo-aggregato; floribus haud [illegible]

Hab. [illegible]

Var. *δ.* PARTHENION, Sieb. et De Vriese, Tumbow Flora, ii. p. 341, cum icone

Bulbus caespitosus; foliis angusto-lanceolatis, 5–7-nervis; sepalis pallide [illegible] vel flavo-[illegible]; [illegible]

Hab. Japonia, [illegible]

Subvar. *viridum*, Sieb. et De Vr. loc. cit. p. 341. Floribus sulphureis.

Var. *ε.* LUTEUM, Regel, Maxim. in Herb. Petr.; Gartenflora, t. 883, 876). (An sp. [illegible] *Buschii*?)

Bulbus caespitosus (fide REGEL), foliis linearis-lanceolatis, 3-nervis; sepalis obtusis vel apice submarginatis, luteis, intus purpureo-[illegible]

Bulbs conspicuous of bright straw colour, about an inch in diameter. Stem 2–3 feet high, erect, glabrous, more or less purplish and pubescent, purplish, and occasionally bearing small bulbils in the axils. Leaves 2–30 scattered, spreading, [illegible] inches long, 4–6 lines broad, narrowed to both ends, faintly downy below, 5–7-nerved. Flowers [illegible] 1½–2 inches long. Sepals 1–1½ inch across, bright scarlet or yellow, sometimes more or less [illegible] spotted [illegible] neck, 8 lines broad, spreading, scarcely spathulate at the base, not [illegible] above, slightly pubescent. Filaments 1 inch long; anthers 3–4 lines [illegible]. Ovary 8–9 lines long; style half as long, [illegible] stigma obovoid, lobed, about as long; seeds very narrowly winged.

THE plant whose intricate synonymy I have endeavoured, with the help of Dr Regel, to unravel, is to me a very puzzling one, and another proof, if such were needed, of the extreme difficulty of deciding on the classification of forms.

Here we have several varieties of one plant differing considerably in habit, colour, and size, but not more so than is usual in the genus, and having flowers all of very similar appearance. But when we come to examine the bulbs, we find two very distinct types, and, were it not for the fact that, as far as my present knowledge extends, [illegible] type has not been found in a wild state, I should at once decide that it had as good a claim to specific distinction as *L. columbianum* has from *L. canadense*.

The first type to which the first two varieties belong has a small [illegible] of [illegible] scales, as shown on the left-hand side of the Plate. The second, however, produces what I may term a nest of bulbs, consisting of four or five of equal size joined together at their base, and, if separated, each capable of producing a similar nest during a year's growth.

LILIUM OXYPETALUM.

ROYLE'S LILY

L. oxypetalum Baker, Journ. Botany xv. p. 73.

Fritillaria oxypetala, Royle, Ill. p. 344; Hook. Bot. Mag. t. 4731; Gard. Chron. 1853, p. 43.

L. triceps, Klotsch, Reise Wald. p. 8, t. 3.

L. nanum, Klotsch, Reise Wald. 53.

Bulbus elongatus, squamis paucis, lanceolatis, acutis, 1½ poll. longis. Caulis gracilis, teres, viridis, glaber, 1–1½-pedalis. Folia 1–30, lanceolata, infra sparsa, 2–3 poll. longa, medio 3–6 lin. lata. Perianthium horizontale, ante infundibuliforme, 16–8 lin. [illegible] segmenta lanceolata acuta, apice recurva, circa 2–2·9 lin. lata, purpurascentibus, intus viridi-virescentibus, extus viridi-virescentibus, medio sulcato-nervosis, punctatis, basi macula papillosa nigrae ornata, prope unguem extra barbato. Stamina serundo in crente breviora; antheris purpurascentibus, 3–4 lin. longis; filamentis divergentibus. Ovarium clavatum, 5–6 lin. longum. Stylus [illegible] Capsula obovoideo-oblonga, [illegible] longa, obtuse angulata, valvis apice [illegible].

Hab. Himalaya occidentalis 8000–12500 ped. (ROYLE, STRACHEY, HOFFMEISTER.)

Bulbs elongated, with few narrow, pointed, white scales, about 1½ inch long. Stem slender, glabrous, 1–1½ foot high. Leaves [illegible], lanceolate, scattered, alternate or somewhat crowded near the top. Flower usually solitary, sometimes 2 or 3 in number; the segments spreading from the base and hardly at all reflexed, about 1½ inch long by 8 or 9 lines broad, purplish in colour spotted at the base inside with darker. Stamens a third shorter than the perianth; anthers scarlet. Ovary club-shaped, [illegible] long; style somewhat shorter. Capsule [illegible] inches long, obtusely angled.

THIS pretty little Lily was apparently first discovered by DR. ROYLE at Tarnua, in Kunawur, in the North-west Himalayas. It was also found by GENERAL STRACHEY at Pindari, in Kumaon, at an elevation of 12500 feet, and by other travellers, but does not appear to be a common plant, as, notwithstanding all the efforts I have made to procure living bulbs, I have been unsuccessful.

It was introduced to England by MESSRS. STRACHEY and WINTERBOTTOM in 1852, and flowered in June 1853 at Kew Gardens. The drawing which was then made by MR. FITCH and published in the 'Botanical Magazine,' plate 4731, is here reproduced.

Lilium triceps of Klotsch, which was gathered by DR. HOFFMEISTER, who accompanied PRINCE WALDEMAR of Prussia during his Himalayan travels, appears to be the same plant. The type specimens (which I have examined in the Berlin Herbarium) only differ from my figure in having the upper leaves more crowded, and occasionally in the presence of 2 or 3 flowers.

L. nanum of Klotsch (which I have seen in the same herbarium) has the appearance of a stunted specimen of the same species, but the specimens are not sufficient to make this certain.

The habit and size of this plant, which is the smallest Lily yet known, give it more the appearance of a *Fritillaria*, but its peculiar long scaly bulb shows at once that its affinity is rather with the Lilies.

LILIUM NEPALENSE.

THE NEPALESE LILY.

L. [illegible] D. Don, Warm. Trans. iii. p. 412. Prodr. Nep. p. 62, Wallich, Cl. Asiat. Res. iii. p. 67. t. 221. Lat. 50°8'. Baker [illegible]

L. nepalense, Wall. in hb. [illegible]

[illegible] Caulis 2–3-pedalis, strictus, gracilis, glaber. Folia sparsa, lucide viridia, [illegible] glabra, lanceolata, acuta, [illegible] Flores [illegible] pedunculis [illegible] foliorum reductorum bracteatos. Perianthium [illegible] infundibuliforme, tubo supe penetis sparsis praeditum; segmentis oblanceolato-lanceolatis obtusiusculis [illegible] Stamina perianthio quadruplo longiora; antheris anguste, 6–7 lin. longis, polline luteo. Ovarium 9–12 lin. longum, cum stylo staminaque glabrum. Capsula ovata, [illegible]

[illegible]

Bulb not known with certainty, but those which I have received as *L. nepalense* resemble small bulbs of *L. Wallichianum*. Stem [illegible] 2 or more [illegible] or scattered. [illegible] inches long, [illegible] lines broad, 5–7-nerved. Flowers solitary or sometimes 2 or 3, drooping, 4–5 inches long, yellowish, more or less marked with vinous inside. Stamens a little shorter than the perianth. Anthers 6 lines long; pollen yellow. Ovary and [illegible] 2 inches long, crowned [illegible]

Found by Dr. Wallich's native collectors at Chandaghur in July, and on the mountain of Gossain-thun, near Kathmandu, Nepal.

The only [illegible] we have [illegible] is derived from the description and plate in Wallich's 'Plantæ Asiaticæ Rariores,' for though specimens exist in herbaria from other sources, I cannot refer them with certainty to Wallich's plant, and I have been unable to procure any further information about it from India. It appears to be confined to the mountains of Nepal, at an elevation of 4000–5000 feet, and, judging from the plate, is a distinct and well-marked species, differing by the drooping position of the flowers from any of the nearly allied plants of the *Eulirion* group. It appears to have been introduced to England in 1835, the following note from the 'Gardeners' Chronicle' for that year, p. 564, being the only notice I can find of its having flowered in Europe:

"A small, single-flowered bulb, with alternate lanceolate leaves. Flowers nodding, with revolute, smooth segments as long as the tube. Stamens shorter than the flower, with deep-orange coloured pollen. According to Dr. Wallich the flowers are dull yellow, as the specimen before us they are greenish, much speckled with purple inside. It is from a very weak bulb, presented to the Horticultural Society by the East-India Company, and which opened on the 10th of July, that this note has been made. The Indian drawings represent the flower to be 5 inches long, which corresponds with Dr. Wallich's account and with our wild specimens. It never seems to grow more than 2 to 3 feet high, and has no odour worth mentioning."

A few bulbs, under the name of *L. nepalense*, were introduced two years ago by Mr. Barr, and one of these is still alive in my greenhouse. As, however, it has not yet flowered, I am unable to be sure of its identity, and have not figured it.

I am inclined to think that Mr. Baker has drawn up his notice on this species in the 'Gardeners' Chronicle' with some other plant in view, but as I believe that the specimens in Wallich's herbarium are the only ones which can be depended on, they have been copied by Mr. Fitch for this work.

LILIUM MARITIMUM.

THE COAST-LILY

[illegible]

Bulbus globosus, squamis conicis, nullo modo ciliatis zonatisque, [illegible]

[illegible]

[illegible]

THIS Lily has been recently described by Dr. Kellogg, of San Francisco, and though it has not yet been [illegible] in a living state to Europe, I am enabled, through the kindness of Mr. Sargent, of Harvard University, to give a figure of it from a dried specimen, which was selected as being fairly typical of the plant, and which is now in the Royal Herbarium, Kew.

Mr. Baker, to whom I am indebted for the description given above, thinks (and I am entirely of the same opinion) that there is, as far as we know at present, no good character by which the plant can be distinguished from *L. columbianum*; but as we have not yet been able to compare the plants in a living state, and Dr. Kellogg must have had [illegible] opportunities of doing so, I should not be right in refusing to recognize it as a [illegible].

I have received from Mr. Roezl, the well-known botanical collector, an account of a Lily which he found on the same coast, between the Eel and American rivers, about 200 miles north of San Francisco, and which I think must be the same. Mr. Roezl sent home bulbs of it under the name of *L. Van Houttei*, but I am not aware that any of them [illegible] or have flowered in Europe (though I received a drawing of it under that name from Messrs. Sander and Co. of St. Albans). He described it as being a dwarf Lily, very distinct in habit from any other, and having a small, orange-red-spotted, campanulate flower. The bulbs resembled those of *L. columbianum*, of which the plant is very possibly a local variety.

The following note on this Lily by Dr. Kellogg was published in 'The Garden,' July 17, 1875:—"This is a very dwarf maritime Lily, recently described, although for five or six years considered doubtfully distinct by Mr. Bloomer and myself, his opinion I find recorded on the label. A year ago I visited its native habitat, devoted particular attention to its special characteristics, and collected many bulbs for distribution to Mr. Bloomer and other friends for study, culture, and comparison. It is now in bloom at Mr. Brookes's, and I think it well worthy of a distinctive name. It has not the creeping, cespitose, or zigzag mass of bulbs like *L. parvum* or *L. pardalinum*, and may be worth a distinct notice hereafter."

LILIUM PARRYI.

PARRY'S LILY

[illegible]

[illegible] Racemus 2–10-flora, bract[illegible] pedicels accrescent to 2 inch. long. Perianth-segments oblanceolate, 2–3 inch. long, [illegible]

Hab. San Bernardino [illegible]

[illegible] *L. pardalinum* and *L. parvum* [illegible] Bulb ovoid-conical, 2–3 inches long. Stem slender, glabrous, 2–6 feet high. Leaves usually scattered, the lower ones occasionally whorled, linear-oblanceolate, 4–6 inches long, [illegible] Flowers 4–8 in a compact racemose, bract-[illegible] pedicels 1–2 inches long, [illegible] spreading, with long narrow claws, slightly spreading from [illegible] stamens and style equal in length, about half an inch shorter than the perianth. Anther-[illegible] Capsule narrow-oblong-acute, 2 inches long by 6 lines wide.

I AM indebted to Mr C. S. Sargent and to Prof. Sereno Watson, of Harvard University, Cambridge, U. S. A. for the description of this Lily.

It was described by Prof. Watson from specimens collected by Dr. Parry early in July 1876 in a [illegible] n San Gorgonio Pass, San Bernardino County, South California.

It appears to belong to the type of *L. Washingtonianum* more than to any other Lily, though I am not sure whether either of these plants can properly be included with *L. longiflorum* &c. in the *Eulirion* section.

The bulbs, as far as I can judge from the excellent drawing, seem to be of a type intermediate between *L. Washingtonianum* [illegible] *L. parvum* [illegible] certain with the former species. It may be that its bulbs, from growing in a marshy situation, have become somewhat modified in form.

I am not aware that any variety of *L. Washingtonianum* has been found so far south as the San-Bernardino Mountains, which lie in about lat. 34° N., on the borders of the desert country which lies between Arizona and California.

I am indebted to Mr Duncan Putnam for the following extract from Dr. Parry's account of the plant —

[illegible] of my last botanical excursions in the vicinity of San Bernardino, in July 1876, I accepted an [illegible] invitation to visit the intelligent brothers J. P. and P. M. Ring in their mountain retreat near San [illegible] Passing the broad and picturesque basin of the Santa-Anna valley near the emergence of the [illegible] from the [illegible] mountain-wall of the San-Bernardino range, our route, after crossing Mill Creek, haggen [illegible] the Upper-Yucaipa valley, thence, by a more rapid ascent in a nearly direct easterly course, [illegible] which [illegible] oak groves, overlooking the broad sweep of the San [illegible] [illegible] extensive [illegible] Pacific Railroad. In [illegible] these mountain [illegible] Gorgonio Pass, [illegible] looks the Messrs. Ring have located a potatoe-ranch, the elevation of over 4000 feet giving a sufficiently cool [illegible] moist climate, while the adjoining mountain-slopes afford an extensive summer cattle-range long after the herbage [illegible] lands has dried up.

[illegible] *Pinus Coulteri* the ground was strewn with the massive cones of this peculiar [illegible] Many of the cones were full 6 inches in diameter [illegible] bearing 4 of 5 inches.

The few perennial watercourses here met with are mostly confined within deep and inaccessible ravines [illegible] out from beneath deep layers of porous strata and spread [illegible] Willow and Alder growths, and occasionally expand into small meadows [illegible]

On all the steep gravelly slopes adjoining there was the usual display of Californian evergreen shrubbery [illegible] of 'chamisal,' is largely used for fuel), the Holly [illegible] (*Prunus ilicifolia*) exhaling a strong odour of bitter almonds, the *Heteromeles arbutifolia* wit [illegible] leaves, and a prevalent form of 'California Lilac' (*Ceanothus crassifolius*) with thick leathery [illegible] The dull green hue which everywhere characterizes the moorish growth, is at this time of year partly [illegible] brilliant scarlet festoons of *Pentstemon cordifolius* trailing over adjoining bushes, or the less showy [illegible] of *Veatchia discoidea*.

"But what soon attracted more exclusive attention was a conspicuous yellow Lily growing abund[illegible] [illegible] grounds adjoining Messrs. Rixe's house [illegible] with their pots [illegible] the care and attention of the unsuspected possessors of the soil. Though not so showy as some other members of the Lily family in this region, there is a grace displayed in its large drooping flowers surmounting a slender stem beset with narrow scattered leaves, which are occasionally crowded at the base into a distinct whorl."

The Lily in question has not yet been introduced into Europe, but is in cultivation in the Botanic Garden of Harvard University.

The careful drawing from which Mr. Fitch has lithographed the Plate was made by Mr. Otto Groenen of Rock-Island Arsenal, Illinois, from dried specimens selected by Dr. Parry, and was pronounced by that gentleman to be a true and characteristic likeness of the living plant.

LILIUM PARDALINUM.

THE CALIFORNIAN LILY

In my previous account of this Lily which accompanied the Plate of the species called *californicum* I stated that the varieties were numerous but as far as I could judge from the examination of a very large number of bulbs of these plants annually for four seasons in my garden, I believed them all to be forms of one species. The synonymy of the plant, however is very confused, and though I have endeavoured to [illegible] I am not sure whether some of the synonyms quoted under this species may not belong to *L. Humboldti*.

Dr. Sereno Watson, of Harvard University, who has recently revised the flora of the Pacific States writes as follows, in a letter dated April 29, 1878:—"I suspect that there is some confusion with regard to *L. pardalinum* and its varieties. My specimens are more scanty than I could wish but I have specimens from Kellogg himself, both of *L. pardalinum* and his var *angustifolium*. His *pardalinum* is from Alameda County, and the stout large flowered form with many leaved verticils. The variety has narrower scattered leaves, and is like Hartweg's no. 2003 (*L. canadense*, var. *Hartwegi*, Baker), which I suppose must also be *L. Roezli*, Regel [illegible] under said to come from Utah, and in my opinion a good variety as compared with what I take to be the typical form. I do not know what your *californicum* is, as I have not access to Lindley's plate. Hartweg's specimen, which Baker refers to it (2004 doubtless), he mentions again in connexion with *L. canadense*, var *puberulum*, Torrey, under *L. Humboldti*. Is it not possible that this *L. californicum* covers forms of *L. Humboldti* which ranges as far north as Yuba Co. at least), as well as perhaps the typical *pardalinum*."

In a later letter dated May 8th, and written after seeing the Plate in the fourth part of this work, Prof. Watson says:—"It seems that my conjectures respecting *L. pardalinum* were, at least in part, correct. Your figure represents exactly what I received from Dr. Kellogg as the typical form, so that there need be, I think nothing more said of a var *californicum*.

After taking into consideration all the facts I have been able to gather respecting this species, I think the best arrangement for its varieties will be as follows:—

1. *L. pardalinum*, Kell., = var *californicum*, Lindl., = *L. Robinsoni* hort., figured in part 4 of this work the Plate lettered incorrectly as *Lilium californicum*.

This, which I take to be the typical form, is easily distinguished from the rest by the size and colour of its flowers, which approach those of *L. Humboldti* in dimensions and brilliancy. This form never, in my experience, bears more than five flowers, usually only two or three. The pedicels usually spring from one point on the stem, as shown in the figure, and do not form a raceme, as usual in the other varieties. This form came true from seed in my own garden, but I cannot say whether it always does so. I believe it was first introduced from Cal. forms to this country by Mr. Robinson of the 'Garden,' who has done more to make Lilies and other hardy plants popular than any other writer.

Hab. Alameda Co., California.

2. *L. pardalinum*, var *angustifolium*, Kell., as figured on the present Plate.

This form, which is perhaps the commonest in gardens, is distinguished by numerous flowers of moderate size lanceolate leaves about 5 inches long by one broad, usually in whorls of eight to twelve, but the whorls are often broken and the leaves scattered.

3. *L. pardalinum*, var *occidentale*, hort. Ware.

A form near the last, but with narrower, more pointed leaves, twelve to fifteen in a whorl, the perianth divisions wider, longer, and more open than in the last. It was raised from seed in Mr. Ware's nursery at Tottenham, but a plant from Sonoma Co., Oregon, which I received from Mr. Hanson, was exactly similar.

4. *L. pardalinum*, var *Ellacombei*.

This form resembles the last two more than the first, but is distinguished by the whorls of leaves being [illegible] nearly double. Each whorl contains about 12-24 leaves in two series. The plant is, in England, frou-

fifteen to twenty days later in flower than the others. It has been in cultivation many years in the well-known garden of the Rev. H. Ellacombe at Bitton, under the name of *L. Mackaui*—but has nothing to do with *L. parryi*, of which *L. Mackaui* is a synonym. It was, I believe, introduced many years ago by Hartweg for the Royal Horticultural Society's garden.

2. *L. pardalinum* var. *pallidifolium*, Baker.

This form, which is, in gardens, usually called *pardalinum*, but is not the *pardalinum* of Torrey, is distinguished by its short, blunt, spathulate leaves, which are constantly of a paler colour than those of the other varieties. It is very florriferous, producing from twenty to thirty or more flowers on a stem from 5 to 8 feet high, but the flowers are individually somewhat smaller and paler than in the other varieties. I first received it in 1873 from Messrs. Backhouse, of York, and I believe it was first introduced, together with other varieties of the same plant, by Mr. B. Rozzl. The first, second, and fifth of these forms certainly appear to be distinct and constant varieties, and the third and fourth have been so for four seasons in my garden, but I should not be surprised to find that their distinctive characters disappeared under changed conditions, and, perhaps, even now they could not be exactly identified with plants in a state of nature.

The habitat of this plant is the coast-range of California and Oregon, from about 1000 to 5000 feet elevation, where it grows in marshy valleys and wet places near springs. It is found growing in great abundance in certain localities, and frequently attains an elevation of 7 or 8 feet. I am not aware that any of the forms of this Lily have been found in the Rocky Mountains, or in Southern California. The habitat given for *L. parryi*, viz. Utah, is, I think, very doubtful, and Mr. Rozzl himself was unable to remember having found any plant of this nature in Utah.

The cultivation of all these forms is so easy, their constitution so good, and their increase so rapid, that I can confidently recommend them to all. Unlike so many Lilies, which year by year get weaker and fewer and soon die, notwithstanding all the pains which has been taken to provide them with congenial quarters, this species is a really good garden plant, requiring only tolerably deep moist soil and protection from wind to develop its full beauty.

The bulbs, when established, produce annually from three to five flowering growths from each old one, soon causing a crowd of fine stems to spring up, and a great abundance of flowers to appear. The seed also, which is produced in favourable seasons, grows much more quickly and easily than is the case with many Lilies, and produces flowering plants in about four years. I have found that it is better to divide the masses of bulbs formed by the varieties of this Lily about once in three years, as they crowd each other so much by their rapid increase that the stems become weak from want of room.

The plant from which my figure was drawn flowered in my garden in July 1876.